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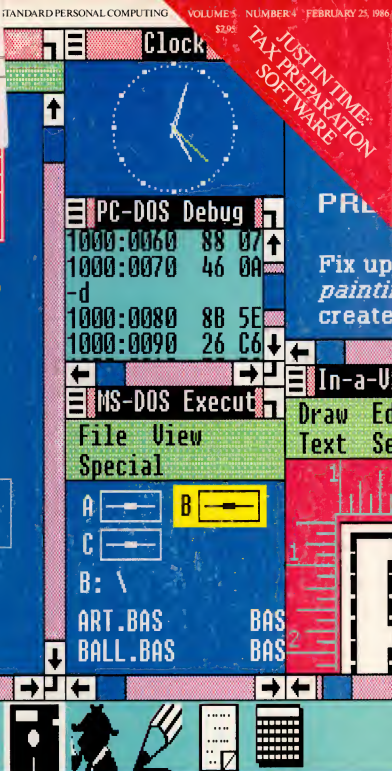
MAGAZINE

# Window Wars!

- Microsoft Windows
- GEM Desktop
- TopView
- DESQview

Tests 8 New  
AT AlternativesSpecial-Purpose  
Word Processors:

- Scientific
- Integrated Programs
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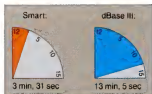
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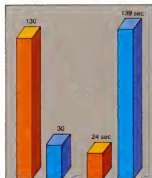
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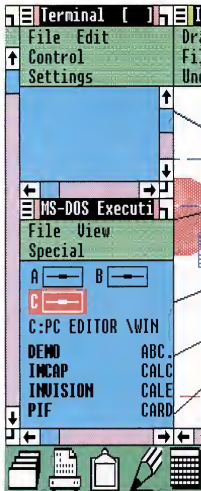


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# PC MAGAZINE



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## COVER STORY

### Operating in a New Environment

*Charles Petzold, Jeff Duntemann, Paul Chisholm, M. David Stone/*At long last, alternatives to the DOS prompt, which has frustrated and stymied many (though not all) PC users since Day One. The four DOS shells reviewed here—*Top-View*, *Microsoft Windows*, *GEM Desktop*, and *DESQview*—can turn your drab display into a menu-oriented desktop with capabilities like concurrency, multiple windowing, cutting and pasting, and file switching. .... 108

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### HARDWARE Computing Options for Power Users

*Frank J. Derfler, Jr., Jon Pepper, Jared Taylor, Winn L. Rosch/*The aging PC AT is getting more competition. PC Magazine Labs evaluates eight new contenders in this high-end market: the AT&T 6300 PLUS, Texas Instruments Business Pro, Zenith Data Systems Z-158, Basic Time BT/AT, Victor VPC, Hewlett-Packard Vectra, Sperry PC/IT, and PC's Limited AT. .... 134



### Building a Better Mouse Interface

*Glenn Hart/*The mouse is no longer just an alternative input device for creating freestyle graphics. Three mice that come with their own programming languages overcome the restrictions of keyboard-oriented software by creating interfaces for your favorite application programs. .... 167

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### The Returns Are In: Tax Software for 1985

*Laura Lou Meadows/*At the top of the short list of programs that make sense for home management is tax software. While *AccuTax*, *TurboTax*, *Tax Preparer*, and *Digitax 1040* can't replace a human tax expert, they and programs like them are boons to accuracy and accountability. They help make you and your accountant more slick, which is the greatest of virtues come April 15th. ... 217

### SPECIAL REPORT The Business of Words: Special-Purpose

In this follow-up to our word processing issue (Volume 5 Number 2), PC Magazine Labs scrutinizes 13 word processors that feature something extra. Some produce scientific symbols, some belong to integrated packages, and a couple run under alternative operating environments. .... 176



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### Cover Photograph: PC Labs

# WHAT'S INSIDE



A PC Magazine cover story is usually the culmination of months of planning, research, and testing. Sometimes, though, the cover story is an eleventh-hour effort to bring you an up-to-the-minute report on a significant product released close to our deadline.

For example, when IBM dropped *TopView* into our laps last winter, we dropped everything to concentrate on a comprehensive look at this important new operating environment (PC Magazine, Volume 4 Number 9).

The cover story in this issue—a comparative review of alternative (to DOS) operating environments is the result of a combination of long-term planning and close-to-deadline mobilization. PC Magazine Labs spent weeks putting together the 26-page testing script and selecting popular programs to run within the operating environments. Associate editor Lisa Kleinman (pictured above) concentrated on choosing the writers. But the moment of truth—the testing itself—had to wait until the very end. We kept receiving updated beta copies of some of the software, which were not what we wanted. PC Magazine rarely tests beta copies for review (and tells you when we do) because it's important that the copies we look at are the same versions available to you.

On the first testing day, our four intrepid reviewers, Charles Petzold, M. David Stone, Jeff Duntemann, and Paul Chisholm, arrived. By the time they finished their morning coffee, the distribution copies of the software had arrived, too. The testing went off without a hitch, and the results, which suggest a clear favorite, appear in "Operating in a New Environment" on page 108.

You may hesitate before exchanging the familiar DOS command prompt for one of the new interfaces reviewed in the cover story, but after you read "Computing Options for Power Users," you might want to trade in your PC or XT for an AT-compatible or "alternative." No one calls them clones anymore; marketing directors have decided to emphasize the enhancements they have added rather than the degree to which their machines mimic IBM. To see how eight high-performance machines distinguish themselves from the IBM AT, turn to page 134.

We learned early on that our readers are interested, especially this time of year, in tax programs. This creates a unique problem for us: Most tax packages are updated annually to reflect changes in the tax code, but many new versions are released too late to evaluate before April 15. Our solution was to identify and review four updated programs that are representative of the dozens available. Laura Lou Meadows's keen observations and helpful conclusions begin on page 217.

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# LETTERS TO PC MAGAZINE



## UNWELCOME RESIDENTS

I enjoyed Bill Machrone's comments concerning the way things have gotten out of hand with RAM-resident utilities ("Loose Ends," From the Editor's Screen, *PC Magazine*, Volume 4 Number 26). I think *PC Magazine* should sponsor a televised show entitled "Battle of the RAM-Resident Utilities." The contest would feature popular DOS enhancement programs—all loaded at the same time. Winners would be declared based on which programs managed to clobber other programs but still remain active themselves. A handicapping system would have to be developed to compensate for the order in which programs were loaded into memory.

A contest between keyboard enhancement programs would be particularly fun to watch. Imagine the excitement of seeing what happens when *ProKey* and *SuperKey* both define Alt-K to perform different, or even the same, tasks.

Should the show go into weekly syndication, *PC Magazine* might get Ed McMahon or Dick Clark to host, with the possibility of guest cohosts (a few good ones might be Philippe Kahn, John Draper, John Dvorak, or Bill Machrone).

Merrill Parker  
Chattanooga, Tennessee

## STRUCK BY LIGHTNING

While I admit Borland International's *Turbo Lightning* information-retrieval program may be a great idea ("A Spark of Lightning," *PC Magazine*, Volume 4 Number 25), getting the full effectiveness out of it will require considerable overhead in terms of hard disk and RAM usage, which could pose a problem for *Symphony* and *Framework* users. The only way I can see *Lightning* being used with maximum

efficiency (given the current limitations of the IBM PC-XT and AT and the limits of PC-DOS 3.1) is to run the program using massive memory boards like the AST RAmPac! or Quadram Liberty II extended memory boards, which allow program source code to be loaded in high memory, under



the Quarterdeck *DESQview* program. In short, the cost of including *Lightning* could run at the very least to a couple of thousand dollars for a higher-capacity hard disk, extra memory boards, and the program itself.

Raymond Chuang  
Sacramento, California

The quality of *PC Magazine* continues to amaze me, but the articles on *Turbo Lightning* sent me flying. I was 30,000 feet over New York state when I read the articles and almost ran up and down the aisles spreading the news.

I've used *PC Magazine* to gather information for term papers on 8088 architecture and on networks for graduate school. In addition, I rely on *PC Magazine* for the

latest technical information and for making buying decisions. One of the most helpful applications of *Turbo Lightning* would be to put "The Encyclopedia of Information for Your IBM PC," that is, *PC Magazine*, in a format for *Lightning*. My "encyclopedia" now measures in excess of 3 feet and contains a wealth of information to which I would dearly love easier access. This product would provide a very important service to a large number of your loyal readers. Please make it happen!

Joseph I. Jackson  
Gales Ferry, Connecticut

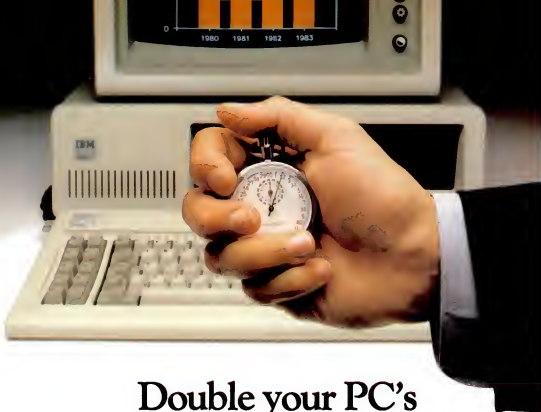
*We agree that for now there's no way to use Lightning's full potential—we noted that fact in our Borland cover story—but fast, cheap, and dense hard disk storage, as well as plenty of RAM to kill, is where the microcomputer industry is beginning to do itself proud. Borland's Turbo Lightning is one of the first products to invest in this bright future.*

*To respond to Mr. Jackson: Okay, we will! Sometime in the not too distant future, PC Magazine will become RAM resident. We're working toward that goal now with Borland International, so sit tight. —Ed.*

## APARTHEID REVISITED

As a subscriber to your excellent magazine, I read every issue with great interest. Generally speaking, the articles are of high standards—and very informative. Not so, unfortunately, is the article by Stan Augarten ("Computers and Apartheid," *Computers in Society, PC Magazine*, Volume 4 Number 25). The very first sentence of the article already demonstrates that Mr. Augarten is on the old badwagon of anti-apartheid clichés. Usually people who fail





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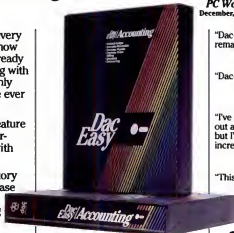
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#105

## ■ LETTERS

to bring refreshing new perspectives and horizons (for which your magazine is known) fall back on clichés that are not trustworthy, not correct, and not truthful. There is no comparison between a South African black and an illegal alien on a California farm, except perhaps for the fact that there are one and one half million blacks from independent neighboring black states in southern Africa illegally in South Africa. If South Africa were hell, one would wonder why so many black people from outside choose to go there.

The article states only half of the reality of the use of computers in South Africa, and this fact therefore suggests one of two possibilities: Either Mr. Augarten did not do enough research to produce a scientifically balanced article, or he is so biased that he is not interested in the rest.

Computers are used in black education in South Africa (a fact not even mentioned by Mr. Augarten). Perhaps he should research more before he picks up his pen again to write a lot of humbug about a country struggling with its problems.

Somerset Morkel  
South African Consul  
New York, New York

"Computers and Apartheid" contains misleading information about IBM computers in South Africa. To the best of our knowledge, there are no IBM computers in use at the South African Department of Interior. IBM does not and will not sell equipment to agencies that enforce apartheid.

Peter F. Judice  
IBM  
Armonk, New York

Stan Augarten replies:

*Mr. Morkel is absolutely right. I fell back on all the old clichés—liberty, justice, democracy. How boring these ideas are. How trite. How passé.*

*As for IBM, perhaps Big Blue's knowledge isn't good enough. According to Automating Apartheid: U.S. Computer Exports to South Africa and the Arms Embargo, a 170-page report published in 1984 by the American Friends Service Committee, IBM computers make apartheid possible. A detailed analysis of how IBM computers are used in the Depart-*

*ment of Interior for the Computerized Population Registry and as the basis for "The Book of Life," an internal identity document issued to all South Africans covered by the Interior Department databank, is on pages 14 to 15 of the report.*

### TURN THE TABLES ON COPY PROTECTION

Concerning your recent reference to the "shrink-wrap" license (From the Editor's Screen, Volume 4 Number 26), why not send a notice to every software company whose software you might consider buying—clearly stating the conditions under which you will buy its software. If the company, its agent, or its dealer takes your money and hands you the software, then it has agreed to your terms. That way if the company ever tries to sue you, the court decision will be based on whose terms prevail, not just on the legality of the terms and whether you violated them.

I've drawn up the following notice, which my company will use in the future. An hour of an attorney's time and a few bucks for postage is cheap insurance against software companies. The notice is as follows:

To: (company name and address) hereinafter referred to as "vendor";  
From: (my name, company, and address) hereinafter referred to as "buyer";

This shall serve as notice that the buyer will purchase software, software documentation, software source code, software object code, packing materials, and any other goods and rights thereto, used on, in, with, by, or about computing devices and/or computer operators (hereinafter referred to as "goods"), only on the buyer's terms as stated in this notice. That the acceptance of payment from buyer to vendor, his agents, or dealer for goods, and the delivery of goods into the hands of buyer by the vendor, his agents, or dealer in return for said payment (hereinafter called "transaction") constitute acceptance by vendor of the buyer's terms.

All rights to goods not expressly reserved by the vendor prior to the transaction become the property of the buyer. Any document or notice contained within the goods that sets limits or restrictions on the buyer, and if said document or notice requires an act of acceptance by the buyer

subsequent to the transaction, and if the terms of said document or notice were not presented to buyer by vendor, his agent, or dealer for the purpose of buyer's expressed written acceptance prior to the transaction, such document or notice shall serve as proof that any limitations or restrictions contained in said document or notice were not expressly reserved by the vendor prior to the transaction.

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Signed

The Day of \_\_\_\_\_, 19\_\_\_\_  
By \_\_\_\_\_

Ray Malone  
Galion, Ohio

### CORRECTIONS

The correct price of *Diagram Master*, reviewed in *PC Magazine*, Volume 4 Number 25, is \$345, and the correct price of *Keeptrack*, reviewed in *PC Magazine*, Volume 4 Number 24, is \$70.

M. David Stone's name was dropped from his item on *Lenipen Graphic Systems*, "The Macintosh Award for Creative Iconography" (*PC Magazine*, Volume 5 Number 1, page 118). Additionally, the editors did not intend to associate *Lenipen* with the Apple Macintosh.

### HOW TO WRITE TO PC MAGAZINE

Do you have a comment, compliment, or criticism about something you've read in *PC Magazine*? A question you'd like to open up to other readers? Then send your opinion, preferably on diskette, to Letters to PC Magazine, *PC Magazine*, One Park Ave., New York, NY 10016. All letters become the property of *PC Magazine* and may be subject to editing. ■





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Keyworks. PC WEEK called it "miles ahead of its competition." We think you'll call it indispensable.

## Feature Comparison

	Keyworks	Superkey
Full macro editor	Yes	No (1)
Access DOS functions from within application programs	Yes	No
Create pop-down moving-bar menu systems	Yes	No (2)
Create pop-down text windows	Yes	No
Create pop-down formats for Date and Time	Yes	Yes
User-designed formats for macros	Yes	No
Command Stack	Yes	Yes
DOS level commands	Yes	Yes
Application program commands	Yes	Yes
Create macros from commands in stack	Yes	Yes
Cut and Paste to a macro to a printer to a file	Yes	No
Printer control macros	Yes	No

(1) Can only edit one macro at a time. (2) Must use an external word processor.  
Suggested retail price is \$89.95. For your nearest dealer, call Alpha at 1-800-451-1018 (in Massachusetts, 1-800-462-2016).

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Software Products Int., *Open Access*  
Software Publishing, *PFS: Graph*  
Sorecim, *Supercalc 3*

In monochrome only.

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**F**or \$395, the Paradise Modular Graphics Card runs all these programs. In monochrome. And in color.

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BPS, *Overhead Express*  
Brightbill-Robert, *Graphix Partner*  
Chang Labs, *GraphPlan*  
Dow Jones & Co., *Dow Jones Market Analysis*  
Lotus Development, *1-2-3*, *Symphony*  
MicroPro, *Chartstar*, *Planstar*  
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Spectrum Holobyte, *Gato*  
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Sublogic, *Night Mission*, *Pinball*  
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Thoroughbred Software, *Exploring the Amazing Food Factory*, *The Fascinating Story of Cell Growth*, *How Plants Grow*, *Migrating Molecules*, *Mastering Units of Measurement*, *Photosynthesis*  
Unicorn Software, *Funbunch*, *Ships Ahoy*, *Ten Little Robots*  
Digital Research, *DR Logo*  
Energonics, *Energonics*  
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Graphic Communication, *Graphwriter BASIC*, *Graphwriter Combination*, *Graphwriter Extension*  
Harvard Associates, *PC Logo*  
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Mouse Systems, *PC Paint*  
PC Software of San Diego, *PC Crayon*  
Peachtree Software, *Business Graphics System*  
Arkrionics, *Jane*  
Eagle Software Publishing, *Personal Financier*  
Monogram, *Dollars and Sense*  
Penguin Software, *Graphics Magician*  
Sierra On-Line, *Homework*  
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## ■ EDITED BY GUS VENDITTO

## PC ADVISOR

*The PC Advisor enhances your productivity by helping you choose the best hardware and software products to meet your specific needs.*

**PROJECTING MORE IMAGES**

I have an IBM PC and a three-projector programmable AVL Coyote for multi-image slide shows. I would like to program six to nine slide projectors. I know that a Genesis IBM-compatible PC exists for this type of programming, but I am hoping to avoid investing in another computer so similar to the one I have.

Jean Oller  
Libertyville, Illinois

You can add up to 3 more projectors to your shows with the Dove X from AVL (Tinton Falls, NJ 07724; (201) 544-8700; \$1,495); in fact, you can add up to 6 for a total of 9 projectors by using two Dove Xs. However, the added images can duplicate only the script you are now programming for 3 projectors on your Coyote. To program more than 3 without using a dedicated computer or the Genesis, you need AVL's brand-new Genesis Board Set (\$1,895). It puts the multi-image programming capability of the Genesis computer into a PC expansion card. The board can program up to 30 projectors; however, you'll need a separate Dove X for every 3 (or fewer) projectors tied in.

**A HIGH-SPEED AT SWITCH**

I have an AT running at 6 MHz and would like to soup it up to run at 8 MHz. However, I have hesitated to do so for fear that some of the software I am using won't run at 8 MHz. My mainstays are Volkswriter for word processing and dBASE III for data management.

Will the 80287 math coprocessor oper-

ate properly at 8 MHz?

What I would really like to obtain is a switchable clock that would allow me to change processing speeds.

John W. Douglas  
House of Delegates  
Annapolis, Maryland

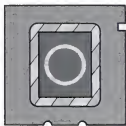
Not only are we aware of such a device—the 286 Turboswitch—we would recommend it to any AT owners thinking of changing their crystal and interested in convenience.

Perhaps I should explain that by clock we refer to the quartz crystal whose vibrations set the rate at which the microprocessors make calculations. The crystal in the AT, unlike the one in the PC and PC XT, can be replaced.

Turboswitch is really a combination of 12- and 16-MHz crystals (remember that the AT runs at a clock speed of one-half the crystal's rating). A cable plugs into the slot



■ The coprocessor runs at one-third the crystal's rate, so you'll step up to a speed of 5.3 MHz when you install a 16-MHz crystal.



left by your old crystal, and the box holding the two crystals slips into the hole above the keyboard cable on the rear of the AT, where you select your speed by flipping a switch. Megahertz Corp. sells it for \$99 (Salt Lake City, UT 84110; (801) 355-8857), which is more than the \$5 to \$15 that a new crystal costs but worth the convenience. The only limitation we can think of is that you have to reboat when you change speeds.

The software you're using will run at 8 MHz, but dBASE III is temperamental—it must be installed at 6 MHz; but runs fine at 8 MHz thereafter. Most software should run better than before; any problems you encounter can probably be traced to software that was copy protected using sector timing schemes. Overall, you probably won't encounter any other problems at 8 MHz, but these exceptions are a good reason to have the flexibility Turboswitch offers. AT owners who change the crystal can always switch back, but it involves taking the cover off.

The 80287 coprocessor runs at one-third the crystal's rate, so you'll step up to a speed of 5.3 MHz when you install a 16-MHz crystal. For faster performance, you can plug in a 287 Fast/8 from Hauppauge Computer Works (Commack, NY 11725; (516) 360-3827; \$379) or Micro Way's 287 8 MHz (Kingston, MA 02364; (617) 746-7341; \$395).

**ASK FOR ADVICE**

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## The Most Powerful LAN Fits on a Disk.

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# GEM, DESQview Challenge TopView and Windows

Windowing programs allow concurrent operation—if you have enough memory.

BY CHARLES BEMANT

The war of the windows has begun. Two Davids, Digital Research and Quarterdeck Systems, are squaring off against the dual Goliaths of IBM and Microsoft, all in a contest to sell software that allows PCs to run concurrent tasks.

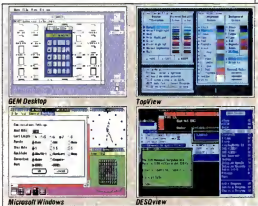
Microsoft Windows, at \$99, came out of the vapor in November, after 2 years of projections about the package. IBM's TopView, unveiled last February, is \$149. Digital's GEM Desktop lists for \$49.95. DESQview is \$99.

Windowing products may start a memory bonanza (see "Operating in a New Environment", page 108). Loading the 128K Word Perfect and the 512K Paradox, for instance, already takes up the 640K-byte DOS limit, leaving no room for data, RAM-resident utilities such as ProKey or SideKick, RAM disks, or the windowing application itself.

Fortunately, Windows and DESQview are able to use the expanded memory of the Intel Above Board and competitors.

GEM and DESQview need 120K bytes and 128K bytes, respectively, while TopView takes 170K. Windows, depending on how it's loaded, takes from 170K to 256K and has a step-aside mode that can reduce it to 40K during operation.

DESQview is the only one of the four that requires no rewriting of programs to make them compatible.



Analyst Michael Goulde of the Yankee Group in Boston believes the need to adapt existing programs hurts windowing programs' chances for success.

Goulde says TopView's hothouse reception and Windows' two-year delay allowed DESQ-

view to emerge as a third force. He believes that TopView takes up too much memory and doesn't consider GEM a contender at all. "Software developers are slow to respond to Windows," he says. "Why

(continued on next page)

## IBM, Hayes, and Kyocera Unveil New PC Modems

### FIRST LOOK

BY M. DAVID STONE

If imitation is the sincerest form of flattery, Hayes Microcomputer Products will be flattered to death. IBM, not known for adopting outsiders' standards, has come out with a pair of opti-

mistically priced 1,200-bps modems that use the near-universal Hayes "AT" commands.

They are the \$499 IBM 1200, a Hayes-compatible, 300/1,200-bps, autodial, autoanswer, internal, half-card modem; and the \$609 IBM 5841 external modem, which adds synchronous communications

at 600 and 1,200 bps. Both also have a special IBM command set that can be used instead of the Hayes commands.

One shortcoming of the internal modem is that unlike most other internal modems, it comes without software.

The IBM modems support call progress reporting (dial

tone, ringing signal, and busy signal), but only in the IBM mode.

All told, the new IBM modems are solid products but hardly remarkable for the price. The IBM modems' biggest asset is the IBM name; coming from almost anyone else, they might be lost in the crowd.

### Hot New Hayes Modems

Hayes, meanwhile, hasn't been idle. It has just introduced its 2400B modem and new versions of the Hayes 1200, 1200B, and 2400.

(continued on page 35)



## Windows

(continued from preceding page)  
would they write for GEM?"

Bruce Grant, chief of technical support for MicroAge computer stores, headquartered in Tempe, Ariz., disagrees. The 153-store chain has distributed GEM with some success. "It insulates users from the operating system, providing a friendly front end," he says. "GEM has a significant, although not dominant, market share."

Windows, along with its writing and painting programs, is the only software package many users will ever need—as long as they have a graphics card, a hard disk, and the extra

memory needed to make it run smoothly. Grant expects all the windowing programs to drive sales of memory boards, graphics boards, and hard disks.

"All these programs position 80286 machines for generic use," he says. "Dealers are looking for reasons to give users the reason to go to the next generation of machines. This may provide it."

### Windows on a Roll

"Windows has that mysterious quality, momentum," says Dave Winer of Living Videotext, which manufactures *ThinkTank* and *Ready!* "There is a tremendous amount of tech-

nology in each package. It's not a \$99 product if you gauge it as to how much is included."

"We are selling a lot of both *Windows* and *DESQview*," says John Williams of the Software Specialist in Washington, D.C. "People like *DESQview* for its concurrency, and *Windows* because Microsoft is a more trusted name in operating systems than IBM. It follows that it would be a more trusted name for environments."

Some of the possible changes to make *TopView* more competitive might include a slimmer size, porting to ROM, and the ability to handle graphics. Predictably, IBM won't comment

about *TopView* or criticism from competitors. Company spokesman Rob Wilson calls *TopView* a strategic product that will evolve over time. "We will continue to add enhancements, and we believe it's an excellent productivity tool," he says.

MicroAge's Grant says that DOS could be marketed with either *Windows* or *TopView* but only after one or the other gained a dominant market position. He suggests that software developers would be wise to write for *TopView*, although "from a technical standpoint, it's the weakest."

Living Videotext's Winer's own unscientific gauge of any

# An IRS That's On Your Side

PC Magazine's Interactive Reader Service has added six more lines to handle the crush.

BY CHRISTOPHER JOHNSTON

Nine thousand modem calls a day pounding on our Interactive Reader Service (IRS) and almost as many irate New York Telephone reps pounding on our doors convinced the editors here at PC Magazine to double the capacity of the IRS from 6 to 12 lines.

We know our readers are junkies for the indexes, programming utilities, and DOS enhancements available through the IRS, so these six additional telephone lines should make the trip to hacker heaven a smoother ride. If 12 lines aren't enough to accommodate the popularity of the Interactive Reader Service, we'll add six more.

The 12-line, 1,200-bps IRS makes its home in two super-legal 8-MHz IBM ATs (IBM authorizes 6 MHz). Purring through those AT innards is a specially tailored version of the

extensive communications package *ASCOM IV* from Dynamic Microprocessor Associates. *ASCOM IV*'s impressive script language lent us the tools to sculpt a multiuser system of impressive power. The IRS's time-slicing, interrupt-driven mode allocates the resources of the two ATs equally with nearly no lag in performance time.

### Electronic Linebacker

The 20-megabyte IRS hard disk drives are packed to the heads with recent Programming and User-to-User utilities, the

index to PC Magazine, and miscellaneous productivity aids and timesavers. A popular option is available for leaving messages about the IRS, comments about PC Magazine in general, and letters to the editor. In addition, hundreds of users have been attracted by our on-line subscription service.

Accessing the IRS isn't as hard as some readers believe, but the basics have to be in order first. The correct parameter settings are 8 data bits, 1 stop bit, and no parity at either 300 or 1200 baud. The IRS supports Xmodem, the error-checking protocol of choice among most U.S. electronic bulletin boards. Check your communications package documentation to see if Xmodem has to be defined with other settings in your parameter screen, because some programs

demand it. Many are the unfortunate users who finally connect to the IRS but wallow in screen gibberish because of incorrect data bit settings.

### Flow Stoppers

PC Magazine's IRS telephone number is (212) 696-0360. In case you forget to note it (for shame!), you can find it in any issue of PC Magazine at the bottom of the masthead page near the front of the magazine. Trying to bypass busy signals by dialing numbers close to (212) 696-0360 is both useless to users and irritating to the innocent folk on the other end because all calls flow through that one number.

Users who successfully access and download IRS files usually do so after a period of automatic dialing. Most Hayes-compatible smart modems include a programmable automatic dialing sequence, and most communications programs have that capability built in. Popular packages with autodialing include PC-Talk III, Qmodem (free), Microstuf's *Crossstalk XVI*, and Hayes Microcomputer Products' *Smartcom* (commercial).

Once in autodial mode, your communications program will dial and redial the IRS phone number while you're doing something else. After your modem handshakes with the IRS, simple menus will guide you to downloading the available files.



A PC AT drives the Interactive Reader Service. PC Magazine's hall-of-board. The backside view (above) shows additional lines being unrolled to the IRS modem rack.



program's success is the number of his customers that request the ability to work in that environment. He says there have been several requests for *Microsoft Windows* compatibility, but none for *TopView*, which he calls "difficult and cumbersome," and "proof that IBM shouldn't be making end user software."

Winer likens Quarterdeck to *The Little Engine That Could*, the train that scales a hill puffing "I think I can...." *DESQview* has borrowed a leaf from the children's story, he says, because "it had the patience to stick it out when no one believed in its product."

## New Modems

(continued from page 33)

When first released last year, the \$899 external Hayes 2400 suffered from a serious problem, now corrected.

The 2400 supports both the European V.22 protocol and the U.S. Bell 212 protocol at 1,200 bps. In the original version of the 2400, the modem would not respond to commands at 300 bps when it was set for V.22 protocol, and it would not respond to commands at 2,400 bps when it was set for Bell 212.

Hayes has changed this so that the command for choosing



The Hayes 1200, top, upgrades the industry standard. Kyocera's 1200S includes Micro Channel Access and cable. And, the IBM 5841, bottom, uses Hayes AT commands.

between the two protocols only affects what happens at 1,200 bps.

For those who prefer internal modems, the Hayes 2400B is fully equivalent to the 2400, permitting communications at 300, 1,200, and 2,400 bps. The 2400B also incorporates the new Hayes Synchronous Interface—Hayes's attempt to create a standard for synchronous communications.

The \$599 Hayes 1200 adds the V.22 protocol along with the Bell 212 standard. A new command—the same one used in the Hayes 2400—chooses between the two. The new Hayes 1200

can detect dial tones and busy signals (an area where the competition had a jump on Hayes), and commands can be typed in either uppercase or lowercase characters.

According to a Hayes spokesperson, the internal Hayes 1200B (\$489) has also been upgraded. Hayes also says existing 1200-baud modems cannot be upgraded to the current specifications.

The old version of the 2400 is upgradable by changing a ROM chip. The change is free, Hayes says. Owners should contact their dealers or Hayes Microcomputer Products directly.

### Kyocera 1200S

Measured against heavyweights like IBM and Hayes, the offering from Kyocera, an up-and-coming name in computer equipment, came up wanting, at least this time around.

The 1200S is a more-or-less Hayes compatible, autodial, autoanswer, 300/1,200 bps, external modem. On the plus side, the modem comes with *Microsoft Access* and with its own RS-232 cable. Unfortunately, the modem doesn't score well in Hayes compatibility.

In PC Magazine Labs' tests, the 1200S worked with *CrossTalk XVI* and *PC-Talk III*, but it would not work with *Smartcom II*, *Relay*, or *Relay Gold* when installed for a Hayes 1200. However, at \$495, the Kyocera 1200S may still be an interesting possibility.

## PC FACT FILE

### IBM 1200 (internal)

### IBM 5841 (external)

IBM Corp.

Information Systems Group

900 King St.

Rye Brook, NY 10573

(800) 426-2468

List Price: Model 1200, \$499;

Model 5841, \$609

**In Short:** Solid, dependable internal and external 300/1,200-bps modems supporting the Hayes AT command set. Note-worthy mostly for the three magic initials on the cover.

### 2400 (external)

### 2400B (internal)

### 1200 (external)

### 1200B (internal)

Hayes Microcomputer

Products Inc.

P.O. Box 105203

Atlanta, GA 30348

(404) 449-8791

List Price: Hayes 2400, \$899;

Hayes 2400B, \$739; \$799 with

*Smartcom II*; Hayes 1200,

\$599; Hayes 1200B, \$489 with

*Smartcom II*

**In Short:** The upgraded 2400 external solves the earlier version's command problems. The internal 2400 is a worthy addition to the Hayes lineup. The industry standard 1,200-bps modems now detect busy signals and dial tones and support the V.22 1,200-bps protocol.

### 1200S

### 300A

Kyocera International Inc.

10050 N. Wolfe Rd., #266

Cupertino, CA 95014

(800) 235-1222

List Price: 1200S, \$645 with

*Microsoft Access*, cable; \$495

alone; 300A, \$75

**In Short:** The 1200S works well with the right communications packages, but it's not 100 percent Hayes compatible and not an outstanding value. The 300A turns any 300-bps direct connect modem into an acoustic modem, but not very well.

## 300A: The Sound of One Hand Clapping

The Kyocera 300A is not a modem, but an acoustic adapter. It plugs into any 300-bps direct connect modem to let the modem talk over a phone handset. This might be useful with a portable or laptop for communication over a pay phone or in a ho-

tel room, but the \$75 300A offers no advantages over a 300-bps acoustic modem, and it introduces too many errors for its use to be recommended. The 300A may be the answer to a question no one is asking.

—M. D. S.



Not a modem but an adapter, the Kyocera 300A, \$75, links a 300-bps direct-connect modem to a standard telephone when an RJ-11 jack isn't available.



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## THE GSS GRAPHICS SYSTEM <sup>NEW!</sup> A Standard Bearer with No True Royalties

Putting graphics tools usually come with backbreaking royalties. That's been too heavy a load for limited market or low-priced applications to bear. The GSS approach also has barriers.

The GSS™ series offers a comprehensive set of programming tools adhering to all the major graphic standards. Indeed, its creators at a major national standards committee. They know that more and more, your customers will be concerned for whether you followed standards to obviate consequences.

At the heart of the system must be the GSS-Devel™ package, which loads atop DOS. It conforms to the proposed ANSI virtual device interface (VDI). Drives runs a variety of devices and switches between them, translating the applications developer from output device variations which require reworking and recompilation.

Then you have a choice of tools. First, "bindings" for C and other languages are available of languages with which your program can build graphic images. Each binding links to Drivers to form a working unit sufficient to produce graphics. Productivity, though, begins with GSS-Tool™. Each—Kernel, Plotting, or Metafile—is a library which wraps the bindings for all the supported languages with the envelope of intelligent tools. Metafile knows how to tie the bindings primitives to draw and color an object, store the sequential instructions, and recreate the object on its own, as well as

segment it, transform it, and all the while return data on attribute settings, system and device status. So powerful, a single command may represent several score low-level statements. It offers all the capabilities of level "2B" of the ANSI Graphics Kernel System, (GKS) spec.

Plotting has equivalent tools specializing in graph and chart generation and their companion "band" it applies and organizes, say "yes," and it builds the numbers into a digestible display for screen or plotters. Kernel and Plotting have tools to convert images they create to visual device metafiles (VDMs), a tokenized standard for storing graphic images as data. The Metafile interpreter reads the contents of a (VDM) and interprets it for re-creation on various devices.

Now, what about royalties? There are none as such. Instead, pay a premium—now or later—for each component and you are free to create any number of applications for redistribution.

Quality support? IBM thinks so. They sell the GSS series under their own label.

Code:	Product:	List Price:	Our Price:
G0001	Drivers	\$200	\$189
G0002	C Bindings	\$150	\$135
G0030	Kernel System	\$495	\$445
G0030	Plotting System	\$225	\$199
G0040	Metafile	\$175	\$155
One-Time Redistribution Premium: Drivers		\$200	all others \$50

## PANEL Screen Input Form Manager

With rising user screenware is a good way to blow completion dates and profits. Panel™ works with you interactively to set up foolproof screen displays and data entry forms rapidly. It tests the form to prove that it (and test data) behave correctly, then converts the finished work into C source code for incorporation into your application, and compilation with Lattice.

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Panel builds in a user interface for key-stroke movement within and between fields, and supplies extensive validation routines for checking user field entries.

Wonderfully diverse attributes may be selected for any field—size, data type, color, or, of course, but also, conversion of input to upper case, elimination of extraneous data, and so on. Fields may be grouped into master-slave format (e.g., dates, phone numbers), a choice of styles for numeric fields, phrases which fill in when their first letter is typed, multiple choice lists with which to choose a field fill-in by clicking a highlighted field. Fields may be multi-lined, even scrolled if larger than screen space allotted.

Product Code S0000 Our Price  
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## BETTER BASIC <sup>POWER!</sup> BASIC Gets Serious With This Hefty Implementation

If you have several thousand hours of BASIC programming under your wing, what a dilemma the great migration to C++ leaves! Leave that experience (and code) behind and head for new horizons? Or stay in the nest and become an endangered species?

Along comes BetterBASIC™. Its design principle is simple—build the most useful aspects of C Pascal, and Modula 2 into BASIC while retaining the familiarity of a language already known to millions.

BetterBASIC is big as hugely expanded features require. If you, your program can go all the way to the PC's full stack. It is comfortable, it behaves like Microsoft BASIC at the interactive level, with a full-screen editor, direct statement execution, and always poised to RUN. But it is fast. BetterBASIC is not an interpreter. It is an incremental compiler: each line you type is compiled (and error-checked) when entered, not re-interpreted over and over at run time. So the classic Sieve benchmark runs over 16 times faster than Microsoft.

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BetterBASIC indents automatically for logical, readable listings, and a saved with statements to encourage structure. Loop control like FOR, WHILE are treated as sealed-off logical blocks. They safeguard against typical BASIC bedlam by not permitting GOTOs in or out.

BetterBASIC adds the renowned power of C++ variables defined in pointers store addresses of other variables assigned to them, such as arrays or strings. Use pointers to directly load new data into addresses at much higher speed.

If you know C you never thought BASIC would ever have structures, but here they are. A structure gathers variables of different types into a record which is given a name. Arrays of such structures may be defined to accommodate data for multiple records. The structure name is that is needed for file reads and writes, leading to the unimagined demise of FIELD, MKII, FILE, LIST, GET, etc. Are you learning Microsoft users? They, and the label of redundant variables they needed, are GONE.

BetterBASIC has "procedures." They take the place of BASIC subroutines. Set up in their own work space and edited separately on the screen, procedures cannot run out of mass program code. They are named by name, not (as in GOSUB) by line number, and variables declared within them cannot be affected by the main program or other procedures unless deliberately passed back and forth. Best of all, once you have sturdy procedures which can be relied on never to fail, more than in compiled modules. Have BetterBASIC told in such modules as load time, so they are generally available to your coding, just like PRINT or INPUT. So what have we here? That's right, an extensible language in which you can add your own commands.

Is it C? No, it's not C++ Well, maybe not. At last it's a real choice.

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List Price \$500.00 \$471.00

## MARK WILLIAMS C SYSTEM Compile With Built In Source Debugging

With the usual compiler, your source code disappears down a black hole. If your program doesn't do what you wanted, there's no telling what's going on there. Hey, thanks for turning the lights on! Mark Williams thinks you shouldn't be marooned in space. Their C Programming System™ expands the universe with a source code level debugger which comes with their compiler, so you can watch your own friendly code, not headless fiction, float by as it associates, with your program's output in another window.

You can set breakpoints to stop execution on source lines or when variables change, log functions called to chart the course your program took, change local variables to test different outcomes.

The compiler itself has long been a

brilliant art. It is a full K&R implementation and then some, with enumerated and void data types, structure measurements, and Bentley rules—fully UNIX compatible. It boasts small and large memory models, 8087 support, 8086able code, DOS calls and the latest computer library around. Extensive optimization lets the compiler turn the fastest code and fast execution of all the compiler languages, especially with the large model. User comments confirm it, and so do reviewers. "Has the most professional feel of any package we tested," Byte (3/83), "Of all the compilers reviewed, first choice for product development," PC World (8/84).

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# Planning Packages Track Your Personal Finances

BY MICHAEL  
GIANTURCO

If one of your New Year's resolutions is to gain control of your personal financial affairs, here's a sample of four programs to help you keep your promise. Worth considering are *Andrew Tobias's Managing Your Money*, *Dollars and Sense*, *J.K. Lasser's Your Money Manager*, and *Sylvia Porter's Your Personal Financial Planner*.

Only the *Tobias* program seems to consider the many differences between personal finance and business finance. The other three programs are essentially the type of accounting programs used for small businesses, perhaps scaled down for individuals.

The *Tobias* program is oriented toward personal goals. Its menu directs you to programs for retirement planning, college planning, rental property management, mortgage refinancing, personal tax estimates, and so forth. The other programs' menus are primarily oriented toward accounts and accounting.

All four programs accomplish these basics, but the *Tobias* software uses the power of the PC to remove both the language (the debits and credits) and the formal structure of accounting.

The kernel of each program is a checkbook and budgeting module. All of them enable you to enter your financial transactions from your checkbook, credit card statements, and other sources into the computer. The deposits and withdrawals are then distributed to separate accounts (groceries, rent, salaries, interest income, and so on). You can begin using the computer to write checks, and thus to simultaneously pay and record your expenditures.

All four programs allow automatic transactions. *Dollars & Sense* has the best automatic

transaction feature of the four.

In any bookkeeping system, accounts must be set up, and checks and deposits must be allocated to these accounts. It is at this point that the *Sylvia Porter* program is flawed. Each account (such as groceries or rent) has a corresponding code number, which must be entered along with the check-stub data. You have to fish the code numbers out of the manual.

All the other programs put the list of accounts on-screen and make it instantly accessible while you are in the process of entering your checks and deposits. Typical household accounts are included on the *Tobias* and *Dollars & Sense* disks. You can create or delete accounts under any of the programs.

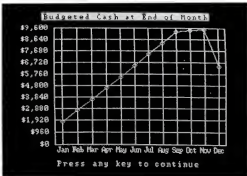
After the transactions have been keyed in, you can use the programs to synthesize budget projections and financial reports, then prepare graphs to show you where you are and where you are likely to wind up. The *J.K. Lasser* program has finished its job at this point. It is part of a series of financial planning software and works with Simon and Schuster's *J.K. Lasser's Your Income Tax*.

*Dollars & Sense* offers a portfolio manager for stocks

and bonds, a tax-estimating feature, and the power to consolidate accounts. It also has a communications program, *Moneylink*, that enables you to pay your bills via modem through banks offering this service. *Dollars & Sense* is a businesslike program. The menus are not straightforward, but you get used to them.

The *Tobias* program has most of these same features, although the communications program is used to retrieve stock and bond quotes for the portfolio manager, rather than to pay bills. The tax estimator takes into account the 1040 plus forms A through G, and W. The program will pass data to J-2-3 (as will *Dollars & Sense*) and to a tax preparation program, *CLR Fast-Tax*.

*Your Money Manager* will compute how much life insurance you need and figure out the real dollars in your pocket attendant on tax-sheltered investments. The manual resides on screen, accessible anytime by pressing the Esc key. The help screens are clear, deftly written, and often make you smile. They are packed with useful advice—a tour de force when facing a backlog of check stubs and receipts. ■



Sylvia Porter's *Your Personal Financial Planner* budgeting package includes this graph of projected cash flow. This individual would evidently do well to build up some reserves against heavy year-end expenditures.

## PC FACT MAGAZINE FILE

**Andrew Tobias's Managing Your Money**, Version 2.0  
Micro Education Corp.

of America

12 Saugatuck Ave.

Westport, CT 06880

(203) 222-9087

(800) 633-MECA in Conn.

List Price: \$199.95

Requires: 192K RAM, 256K on Tandy 1000 or the PCjr, one disk drive, DOS 2.0 or later.

In Short: The best of four programs here. Most suitable for personal, as opposed to small business, money management. Copy protected.

**Dollars and Sense**, Version 2.0  
Monogram Software

8295 S. La Cienega Blvd.

Inglewood, CA 90301

(213) 215-0529

List Price: \$179.95

Requires: 256K, one floppy drive, DOS 2.1 or later.

In Short: Very businesslike, with appeal to people familiar with business accounting. Copy protected.

**Sylvia Porter's Your Personal Financial Planner**

Timeworks Inc.

444 Lake Cook Rd.

Deerfield, IL 60015

(312) 948-9200

List Price: \$129.95

Requires: 128K RAM, one disk drive.

In Short: Organized for people familiar with bookkeeping, but not well adapted for personal application. Copy protected.

**J.K. Lasser's Your Money Manager**

Simon and Schuster

1230 Ave. of the Americas

New York, NY 10020

(212) 245-6400, ext. 1145

List Price: \$79.95

Requires: 128K RAM, one disk drive, DOS 2.0 or later.

In Short: Succinct program (second module in a series) for budget and checkbook management, accounting, ledger reports, income, and expenses. Can create graphs with data. Copy protected.

# This Little Fella Means Business.

The Mouse by Maynard Electronics makes your favorite programs faster, easier, and smarter!



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\*Symphony and Lotus 1-2-3 are trademarks of Lotus Development Corporation. Framework is a trademark of Ashton-Tate. MultiMate is a trademark of SoftWord Systems Inc. Telepoint is a trademark of LCS/Telegraphics.



## Teach The Mouse To Type.

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Compare our Mouse with the others running around and you'll see, there's no comparison! Here are just a few features across the board:

FEATURES	Maynard Mouse	Micro-soft	Mouse Systems
# of Button Combinations	7	3	3
Button Auto Repeat	Yes	No	No
Diagnostics	Yes	No	Yes
Dynamic Scaling	Yes	No	No
Cursor Overshoot Control	Yes	No	No
Adjustable Cursor Speed/Up, On (while running application)	Yes	No	No
Adjustable Cursor Speed/Rt, Lft (while running application)	Yes	No	No
Buttons-Definable (while running application)	Yes	No	No
Macro-Definable (while running application)	Yes	No	No
User-Definable Alternate Cursor Movement	Yes	No	No

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## NEWS IN BRIEF EDITED BY JANE MINTZER

**Boosting the PC . . .** MicroSpeed Inc., of Fremont, Calif., has announced an accelerator board that will enhance the speed of an IBM PC, XT or compatible.

Fast88 boosts the speed of a computer by replacing the standard Intel 8088 CPU with a higher-speed 8088-2 (or optional NEC 8088 V-20 enhanced CPU chip). Fast88 allows you to switch between the



For \$129.95, MicroSpeed Inc.'s Fast88 can boost the performance of your IBM PC, XT, or compatible up to 60 percent.

normal 4.77-MHz system clock and speeds of 6.1 MHz, 6.7 MHz, or 7.4 MHz. According to MicroSpeed, performance improves by at least 30 percent. With the NEC chip at 7.4 MHz, it is 60 percent. Programs that use the system clock for DOS time and date functions are not at all affected by the increase in processor speed.

MicroSpeed says that Fast88 is compatible with most of the popular software packages, including WordStar, Symphony, dBASE II and III, and I-2-3.

Fast88 costs considerably less than the more expensive turbo cards. The card has an introductory price of \$129.95 (\$169.95 with the NEC V-20 chip) through March, when prices will go up \$20. For more information, contact MicroSpeed at 4546 Peralta Blvd., #18, Fremont, CA 94536, (415) 795-1944.

**As Easy as Typing 1-2-3 . . .** Lotus Development Corp. has agreed to acquire the existing products and technology of the GNP Development Corp., of Pasadena, Calif. The first product that Lotus plans to bring to market after it has fine-tuned it to its satisfaction is GNP's HAL (human access language), an English-language interface to 1-2-3.

HAL will first be developed as a standalone accessory to 1-2-3 and will enable users to use 1-2-3's functions by typing English language commands. As a memory-resident program, HAL also lets users write macros in English, link spreadsheets, and use its natural-language database query facility. HAL also features an Undo command.

Lotus says, "HAL will add value to using 1-2-3 and will allow spreadsheet users, both beginners as well as sophisticated users, to be more creative about the way they think about and use spreadsheets."

Lotus says there is a possibility that it will incorporate HAL into its already existing or future products, but this idea was still only a consideration.

**Low Cost Slide Show . . .** Show Partner, a \$69 graphics and animation program announced by Brightbill-Roberts and Co., Ltd. (of GraFX Partner fame), might be more than just competition for IBM's PC Storyboard.

Show Partner's memory-resident graphics editor is a legacy from GraFX Partner, which Brightbill-Roberts found was being used by PC Storyboard aficionados as an enhancement tool. The lower price and comparable features, it says, make Show Partner a feasible alternative to PC Storyboard.

Like PC Storyboard, Show Partner is geared toward any professional who wants to communicate an idea graphically; from developers who want to animate their products' attributes to investment bankers who want to make a 1-2-3 graph spiffier. It runs on color

and enhanced color graphics PC systems.

GraFX Partner will be dropped because Show Partner includes all of GraFX Partner's features at a lower price, according to Stephen Brightbill, president of Brightbill-Roberts. However, files for the two programs are compatible.

Show Partner consists of the graphics editor, two disks of clip art, and prerecorded PC sound tools. Tech support costs another \$30. For users of the \$149.95 GraFX Partner, Show Partner is \$30.

For more information, contact Brightbill-Roberts, 120 E. Washington, #421, Syracuse, NY 13202; (315) 474-3400.

**The Missing Link? . . .** Relational Database Systems Inc., the maker of INFORMIX-SQL, a high-end relational database management system, has developed a fourth-generation programming language.

INFORMIX-4GL is a powerful, full-function system-development language that can do report writing, screen generation, SQL (structured query language) queries, user-interface customization, and procedural and nonprocedural syntax.

Geared toward programmers, INFORMIX-4GL is fully compatible with INFORMIX-SQL, which remains on the market. RDS says INFORMIX-4GL is easily linked to C or Cobol routines. INFORMIX-4GL runs on PC-DOS, UNIX, and networked systems. Relational Database Systems says it currently has DOS installations at about 5,000 sites and 25,000 Unix installations. Price is \$995.

The PC-DOS version of INFORMIX-4GL will be available in March, according to RDS vice-president Laura King. A version for the IBM PC Network will follow, but the price and release date have not yet been set.

For more information about INFORMIX-4GL contact Relational Database Systems, 4100 Bohannon Dr., Menlo Park, CA 94025, (415) 322-4100.

**Drive-on-a-Card . . .** The race to add more power to your personal computer in as little space as possible has a new entrant—the CMS Drive Plus family of 20-megabyte internal hard disk drives. CMS Inc., of Santa Ana, Calif., joins several other manufacturers, including Plus Development Corp., Mountain Computer Inc., Western Digital, Tandon, and MicroScience in providing add-in drives that will fit into a single, full-size expansion slot of an IBM PC-XT or compatible.

The three models of the CMS drives include a SCSI (Small Computer Systems Interface) version for \$745, one with the standard 5 1/4-inch ST-506 disk drive interface using a standard 3 1/2-inch drive for \$595 and an ST-interface model with hard lifters on the "ruggedized" drive (to lock the read/write head so that it never touches the media when the drive is not in use) for \$695. OEM discounts are available.

Because of the size of the Drive Plus, the adjacent expansion slot on one side must be filled with a short card. For more information, contact CMS at 401-B W. Dyer Rd., Santa Ana, CA 92707, (714) 549-9111.



Three new models of the CMS add-in hard disk drives supply 20 megabytes of storage capacity on a single expansion slot.

InfoWorld on EasyLAN  
 "Any product that brings  
 down the cost and improves  
 the ease of use for LANs is  
 for the better."

# Buy A Local Area Network For Less Than \$100 Per PC

**STOP** buying expensive duplicate PC peripherals. Usually your peripherals just sit idle. If your office owns two or more PCs can you justify a costly printer and multiple disk drives for each PC? How often are your printers actually busy? Thirty minutes a day? An hour a day? Even your expensive hard disk is used infrequently.

The obvious solution to avoid expensive duplicate peripherals is a local area network that allows you to share printer and disk drives. But until now LANs have cost in excess of \$1,000 per PC.

## INTRODUCING THE EasyLAN™ OFFICE NETWORK

EasyLAN shares printers and disk drives between IBM PCs. EasyLAN can save you \$1,000 or more per PC by eliminating duplicate equipment purchases.

EasyLAN advantages:

- EasyLAN shares printers, disk drives, and information
- Easy to justify—less than \$100 per PC
- Easy to install
- Easy to operate
- Easy to order
- EasyLAN performs in the background.

EasyLAN's low price matches the small business user's cost-sensitive budget. It is the office network solution for less than \$100 per PC including cables and software. At this price, the RISK IS LOW, and the BENEFITS ARE HIGH.

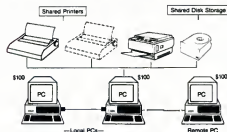
EasyLAN performs its operations concurrently in the background. EasyLAN communications, file transfers and printer operations all take place while each PC simultaneously performs such normal DOS applications as Lotus 1-2-3, WordStar™ and dBASE.™

## EASY TO OPERATE

EasyLAN network software allows PC users to share printer and disk peripherals. PCs are connected by EasyLAN cables plugged directly into your PC's standard serial communication ports and EasyLAN can be used with digital PBXs. EasyLAN supports geographically separated PCs using modems and dial-up lines.

EasyLAN's performance meets your small office requirements to move word processing documents and spread sheets between PCs. For example, EasyLAN can move a 10 page document between two PCs, as a background operation, in less than one minute!

EasyLAN loads automatically at boot time. It manages the PC's serial and parallel ports for



## EasyLAN Office Network

communications and printing. All EasyLAN operations may be started from any connected PC.

Printer sharing operates transparently with existing programs. Print files are automatically written to disk and scheduled for printing. Multiple printers per PC may be designated for specific office tasks.

For example, one PC can interface with Printer 1 for general purpose output, with Printer 2 for continuous-form letterhead stationery, and with Printer 3 for printing continuous-form invoices.

Disk sharing uses EasyLAN's COPY command, EZZCOPY™ to move files to and from PCs. Files are stored or retrieved from disk storage and the Directory is updated. The high-capacity benefits of just one hard disk can now be shared by several PCs.

All communication operations are protected by a unique password assigned to each PC so security is maintained.

## EASY SPECIFICATIONS

Each PC in the network requires an individual copy of the EasyLAN software, 128K of memory, a serial communication port(s), and DOS 2.0 or above. For your convenience, EasyLAN diskettes are not copy protected. EasyLAN runs on all IBM PC models (PC, XT, AT, and Jr) and compatible PCs.

## EASY TO INSTALL

EasyLAN can be installed in less time than it takes to enjoy your coffee break. Just plug the EasyLAN cables into existing serial ports. EasyLAN's PRINT, COPY and DIRECTORY commands are very similar to DOS commands.

## EASY TO ORDER

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## Budget Word Processors: Brown Bag, DacEasy Word

### FIRST LOOK

BY ROBIN RASKIN

Two new under-\$100 word processors boast ease of use and an impressive array of features. Software Resource's *Brown Bag Word Processor* is PC-Write in a new wrapper, and *DacEasy Word* is an easy-to-use, somewhat awkward derivative of the *Multimail* school.

*Brown Bag* is a repackaged version of Quicksoft's well-known *PC-Write* (see "The Business of Words," *PC Magazine*, Volume 5 Number 2, for a review). *Brown Bag* (that's what it comes in) has added spelling and mail-merge features, copy protection, and an extra \$30 to the price.

I admire *Brown Bag*'s speed and power, but the complexity and somewhat arbitrary nature of its embedded commands

make it a good program for the heavily addicted hacker.

### DacEasy Word

A less demanding program is *DacEasy Word*, from the makers of the highly successful *DocEasy Accounting System*.

This word processor has some notable features but doesn't match the quality of *Dac Software*'s much-lauded accounting program.

## Volkswriter 3 More Power

BY DARA PEARLMAN

When *Volkswriter* made its debut in 1982, it was aptly named. Like its automotive namesake, it was compact, maneuverable, and reliable, but not powerful.

No more. The software mechanics at Lifetree have souped up this people's word processor with spelling correction and on-screen math in *Volkswriter 3* (Version 1.0), which arrived in late 1985 with a \$295 sticker price as a replacement for *Volkswriter Deluxe* (see "The Business of Words," *PC Magazine*, Volume 5 No. 2). *Volkswriter 3* is poised to conquer the middle of the professional word processing marketplace.

Happily, *Volkswriter 3* doesn't let the weight of its new features slow it down. Continuing another Lifetree tradition, *Volkswriter 3* is not copy protected.

A menu-driven program with a faintly *WordStar*-like feel, *Volkswriter 3* opens with a menu that presents the main program options, such as editing or printing a document. Function keys, invoke all editing commands, so there's no switching between insert and edit modes. An integrated text-merge module takes care of mass-mailing chores. Printer drivers support proportional spacing and microjustification.

*DocEasy Word*'s features—mail-merge, undo, a spell, full justification, and windowing—suffer from poor implementation. To its credit, the program is not copy protected, has good printer support, and installs easily.

The menu is based on function keys. A bottom menu constantly displays information about the changing function key commands. Combined with *Dac*'s context-sensitive help screens, the program is easy to learn. There are 20 Alt key commands plus some advanced features, such as the ability to bypass tedious menu operations.

New in *Volkswriter 3* is a layout command, which controls margins, spacing, and tabs and allows up to 15 different layouts in the same document. You can store your favorite layouts in "style sheets" for use with other documents.

Other handy new features include a 170,000-word spelling checker and a math command that totals up columns and solves four-function equations. *Volkswriter 3* can hyphenate words without your intervention and can import and export files in IBM's RTT-DCA (reversible form text/document content architecture), *WordStar*, and straight ASCII formats. If you have a hard disk and run DOS 3.0 or 3.1, you can use its new print-spooling feature.

While *Volkswriter 3* still lacks features like footnote handling and split-screen editing offered by its competition, it performs most of the common

*DocEasy Word*'s three modes of operation—edit, insert, and delete—involve constant struggle. In edit mode, overstrike is the only option. When in the drop-down insert mode, the cursor movement keys and all command keys are inoperable. Delete mode is functional but not very fast.

*DacEasy Word* lacks a more direct way of doing text enhancements like underline, boldface, and superscript. You can't force a page break, create a macro, or save a block of text. The manual overlooks important references, and there is no way to create a table of contents or index.

word processing functions with ease and elegance. If not yet a Ferrari, *Volkswriter 3* is no longer a subcompact.

## PC FACT FILE

### Volkswriter 3

Lifetree Software Inc.  
411 Pacific St.  
Monterey, CA 93940  
(408) 373-4718

List Price: \$295 upgrade from *Volkswriter Deluxe*, \$95 plus \$3.50 shipping

Requires: 256K RAM, two disk drives, DOS 2.0 or later (320K RAM, hard disk drive, DOS 3.0 for print spooling).

In Short: New spelling checker, math functions, style sheets, and auto-hyphenation boost *Volkswriter*'s powers. Not copy protected.

## PC FACT FILE

**Brown Bag Word Processor**  
Software Resource Group Inc.  
15100 El Camino Grande  
Saratoga, CA 95070  
(408) 395-9568

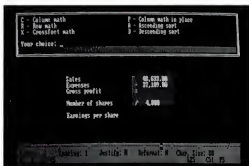
List Price: \$89.95 with mail-merge and spelling checker  
Requires: 64K RAM.

In Short: A modified and re-labeled *PC-Write* clone with power, speed, and complexity more suited to the sophisticated user. Copy protected.

**DacEasy Word**  
Dac Software Inc.  
4801 Spring Valley  
Bldg. 110-B  
Dallas, TX 75244  
(214) 458-0038

List Price: \$49.95  
Requires: 256K RAM, two floppy drives, DOS 2.0.

In Short: Offers the pluses of a full-featured word processor but lacks refinement and smoothness. Not copy protected.



*Volkswriter 3*'s math command can calculate the gross profit and earnings per share in this example. After you mark the block, it takes just two keystrokes.

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<b>Apple II Modem XII</b>	<b>109.95</b>	<b>NEC 2860 200PS Letter Quality Printer XII</b>	<b>899.00</b>
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<b>Apple II Modem XIV</b>	<b>109.95</b>	<b>NEC 2860 200PS Letter Quality Printer XIV</b>	<b>899.00</b>
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<b>Apple II Modem XVI</b>	<b>109.95</b>	<b>NEC 2860 200PS Letter Quality Printer XVI</b>	<b>899.00</b>
<b>Apple II Modem XVII</b>	<b>109.95</b>	<b>NEC 2860 200PS Letter Quality Printer XVII</b>	<b>899.00</b>
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<b>Apple II Video Card VII</b>	<b>109.95</b>	<b>NEC 2860 200PS Letter Quality Printer VII</b>	<b>899.00</b>
<b>Apple II Video Card VIII</b>	<b>109.95</b>	<b>NEC 2860 200PS Letter Quality Printer VIII</b>	<b>899.00</b>
<b>Apple II Video Card IX</b>	<b>109.95</b>	<b>NEC 2860 200PS Letter Quality Printer IX</b>	<b>899.00</b>
<b>Apple II Video Card X</b>	<b>109.95</b>	<b>NEC 2860 200PS Letter Quality Printer X</b>	<b>899.00</b>
<b>Apple II Video Card XI</b>	<b>109.95</b>	<b>NEC 2860 200PS Letter Quality Printer XI</b>	<b>899.00</b>
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Amdek Video 2004 Mono Type Amdek	130.00	(\$ 00)				
Amdek Color 2004 16-Channel Composite	215.00	(\$ 00)				
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**Any disk intensive program (like a database) runs 2 to 4 times faster.**

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**LIGHTNING<sup>™</sup>** comes to you on a diskette. You simply load it onto your DOS diskette if you are using floppies, or if you have a hard disk, into the DOS area. Simple A-B-C instructions let you get it started the first time in five minutes. Then it is always ready, working automatically in the background any time you boot up.

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When you work with a database program or most word processors, or any time you need to frequently load files into RAM or save them back, you are accessing your disk. It is such a pleasure to cut those times in half and often to one-fourth.

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PCSG since early 1983 has dominated the lap portable market with ROM software such as Lucid spreadsheet and Write ROM that reviewers rated as excellent. We are proud to enter the IBM PC market with **LIGHTNING<sup>™</sup>**. It's a great product that we not only enjoy offering, but enjoy using on our own PC's. It will support IBM PC, XT, and AT.

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LIGHTNING<sup>™</sup> PCSG 1985  
Sidekick<sup>™</sup> Borland Int.  
Above Board<sup>™</sup> Intel Corp.



## PC UPDATE BY VIRGINIA DUDEK

NEW YORK—Quadram Corp. of Norcross, Ga., has announced an upgrade program for its Datavue 25 PC-compatible. Owners can send their old machines to Quadram and choose from among five configurations that expand the Datavue's memory up to 1.3 megabytes. Each upgrade also comes standard with an 8087 coprocessing slot, six different screen palettes, enhanced compatibility, RGB, and composite ports. The program continues through March 31. Prices are: Datavue with 128K bytes upgraded to 256K bytes, \$350; with 128K upgraded to 768K, \$525; with 128K upgraded to 1.3 megabytes, \$625; with 640K upgraded to 768K, \$400; with 640K upgraded to 1.3 megabytes, \$500. A \$225 backlit screen will be available in March.

IBM has standardized all new versions of the PC AT to run no faster than 6 MHz, claiming that that's the speed for which the AT was tested and built. All new ATs, IBM confirms, not just the units with IBM's new 38-megabyte hard disk introduced last fall, will have a new ROM BIOS chip that restricts the AT's microprocessor speed to 6 MHz., although most competitors' 80286-based machines run at 8 MHz, and under-\$25 crystal sets allowed earlier ATs to run at 8 MHz and faster.

Lotus Development Corp. of Cambridge, Mass., confirmed that users of 1-2-3, Release 1A, who opt not to upgrade to Release 2.0 can obtain free drivers from Lotus authorized dealers for the IBM Enhanced Graphics Adapter (EGA) board, which allows graphics on both monochrome and color monitors. The drivers are contained on a free disk, called the Video Display Library. CompuServe subscribers can also download a file that contains the EGA drivers by accessing The World of Lotus on the CompuServe menu.

Microsoft Corp. of Bellevue, Wash., has announced Version 2.0 of Microsoft Project, the project-scheduling and project-costing program. New features include PERT charts, time increments varying from minutes to months, planned versus actual comparisons, and the ability to handle larger projects—up to 255 resources and 999 activities in 640K bytes. Also included are the ability to develop calendars for individual workers in your chart and a conflict resolution flag that automatically notes any conflicts in timing or resource scheduling. Registered owners can upgrade to Version 2.0 for \$125. Contact Microsoft Customer Service at (800) 426-9400 or those in Washington state can call (206) 828-8800.

**Short Takes:** CompuServe of Columbus, Ohio, has added Microsearch, a database of over 20,000 abstracts about PCs and related products, to the CompuServe Information Service. It cites over 200 micro-related periodicals and product literature from over 4,500 vendors. A \$18-per-hour surcharge is added to the regular CompuServe connect rates when accessing Microsearch. ... Microstuf of Roswell, Ga., has dropped the price of Infocope, its memory resident data management software program, to \$79. ... Software Studios Inc. of Annandale, Va., has released Version 6.0 of PC-DESK III, its desktop management program. New features include file encryption/decryption to protect sensitive information from unauthorized access, the addition of color, and full-screen data entry and editing. Upgrades from previous versions of PC-DESK III are free. There's a \$25 fee to upgrade from PC-DESK or PC-DESK II.

PC Update reports on software and hardware enhancements. To contribute, write or call Virginia Dudek, PC Magazine, One Park Ave. New York, N.Y. 10016 (212) 503-5265.

## Chart Corporate Ladders

BY GLENN HART

*Org*'s sole purpose is to generate organizational charts, and *Org* makes organization chart definition straightforward. Common organization chart conventions are observed, such as adding an individual's title and subtitle. Charts can be footnoted, and even unusual intricacies of corporate structure are handled smoothly. *Org* operates totally in text mode and doesn't need graphics hardware, and it can print its charts on almost any printer that can be connected to a PC.

The chart-definition phase

could hardly be easier. Information on individuals is entered in forms, and the reporting relationships are conveyed by single letter codes. Dotted-line relationships and other unusual situations can be easily described. Various editing commands are provided, including moving blocks of jobs. Staff positions like secretaries or administrative assistants can be included. On-line help is always available, and the documentation is clear and to the point.

*Org* automatically determines box sizes, using compressed or small type fonts if necessary and if available on the

printer in use. The charts are perfectly laid out and attractive.

Strangely, *Org* cannot print directly to a serial printer, although output can be stored in a disk file and subsequently printed on printers connected serially. Another oddity is that *Org* sometimes hangs the computer on exit, requiring a power off/on cycle.

Otherwise, though, *Org* performed flawlessly. It is difficult to conceive how producing an organization chart could be made any simpler. Given the tortuous procedures required by other software to produce organization charts, *Org* is highly recommended for the next time you're confronted with producing organizational graphics. ■



### FACT FILE

#### Org

Banner Blue  
P.O. Box 7865  
Fremont, CA 94537  
(415) 794-6850

List Price: \$69.95

Requires: 192K RAM, one disk drive, DOS 2.0 or later.

**In Short:** *Org* does only one thing, but it does it exceedingly well. Organization charts are difficult to produce with other graphics software, but *Org* produces professional organization charts with a minimum of fuss.

# What the world really needs is a 69 cent Double Sided, Double Density Diskette with a LIFETIME WARRANTY!

## And DISK WORLD! has it.

**Introducing Super Star Diskettes:  
the high quality diskette with  
the lowest price  
and the best LIFETIME WARRANTY!**

In the course of selling more than a million diskettes every month, we've learned something: higher prices don't necessarily mean higher quality.

In fact, we've found that a good diskette manufacturer simply manufactures a good diskette...no matter what they charge for it. (By way of example, consider that none of the brands that we carry has a return rate of greater than 1/1,000th of 1 percent!)

In other words, when people buy a more expensive diskette, they aren't necessarily buying higher quality. The extra money might be going toward flashier advertising, snazzier packaging or simply higher profits.

But the extra money in a higher price isn't buying better quality.

All of the good manufacturers put out a good diskette. Period.

### How to cut diskette prices ...without cutting quality.

Now this discovery posed a dilemma: how to cut the price of diskettes without lowering the quality.

There are about 85 companies claiming to be "diskette" manufacturers.

Most of them are manufacturers or marketers taking other company's components, possibly doing one or more steps of the processing themselves and passing their labels on the finished product.

The many IBM diskettes, for example, are one of these. So are IBM 5 1/4" diskettes. Same for DYSPAN, Polartek and many, many other familiar diskette brand names. Each of these diskettes is manufactured in whole or in part by another company!

So, we decided to act just like the big guys. That's how we would cut diskette prices without lowering the quality.

We would go out and find smaller companies to manufacture a diskette to our specifications, specifications which are higher than most...and simply create our own "name brand" diskette.

Name brand diskettes that offered high quality at low prices.

### FRAUD ALERT!

Please be careful!

A lot of the "no-name" diskettes flooding the market at prices of less than \$1.00 are what we in the industry call "floor sweepings."

In other words, they're garbage...stuff that six months ago, no self-respecting manufacturer would have sold.

But times got tough and some people's scruples got a little lost in desperation...and so a lot of computer users are getting some really bad disks...and that isn't bargain at all.

So, when the price seems too good to be true...like 39 cents, be careful...very careful!

HOURS:

8AM-6PM Central Time, Monday through Friday



Super Star Diskettes are sold in multiples of 50 only. Diskettes are shipped with white Polyester-regenerated cardboard sleeves, reinforced hubs, user ID labels and white protect tabs.

**Boy, did we get lucky. Our Super Star Diskettes are the same ones you've been using for years...without knowing it.**

In our search for the low priced, high quality diskette of our dreams, we found something even more interesting.

We found that there are several manufacturers who don't give a hoot about the consumer market for their diskettes. They don't spend millions of dollars in advertising trying to get you, the computer user, to use their diskettes.

Instead, they concentrate their efforts on turning out the highest quality diskettes they can...because they sell them to the software publishers, computer manufacturers and other folks who (in turn) put their name on them...and sell them for much higher prices to you!

After all, when a software publisher or computer manufacturer or diskette marketer puts their name on a diskette, they want it to work like a charm, every time. (Especially software publishers who have the nasty habit of copy-protecting their originals!)

### HOW TO ORDER:

ORDERS ONLY:

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(In Illinois: 1-312-256-7140)

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1-312-256-7140

FOR FASTEST SERVICE, USE NO-COST MCI MAIL. Our address is DISKORDER. It's a FREE MCI MAIL letter. No charge to you. (Situation permitting we'll ship these orders in 24 hours or less.)

**SHIPPING:** 5 1/4" & 3 1/2" DISKETTES—Add \$3.00 per each 100 or fewer diskettes. **OTHER ITEMS:** Add shipping charges as shown in addition to other shipping charges. **PAYMENT:** VISA, MASTERCARD and Prepaid orders accepted. **COD ORDERS:** Add additional \$5.00 special handling charge. **APD, FPD, AL, IN & PR ORDERS:** Include shipping charges as shown and additional 5% of total order amount to cover P&H and insurance. We ship only to United States addresses, except for those listed above. **TAXES:** Illinois residents, add 7% sales tax.

MINIMUM ORDER: \$25.00

**Super Star Diskettes. You already know how good they are. Now you can buy them...cheap.**

Well, that's the story.

Super Star diskettes don't roll off the boat from Pago Pago or emerge from a basement plant just east of Nowhere.

Super Star diskettes have been around for years...and you've used them for years as copy-protected software originals, unprotected originals. Sometimes, depending on which computer you own, the system master may have been on a Super Star diskette. And maybe more than once, you've bought a box or two or more of Super Star diskettes without knowing it. They just had some "big" company's name on them.

Super Star Diskettes are good. So good that a lot of major software publishers, computer manufacturers and other diskette marketers buy them in the tens or hundreds of thousands.

We buy them in the millions.

And then we sell them to you.

Cheap.

**When every little bit counts, it's Super Star Diskettes.**

You've used them a hundred times...under different names.

Now, you can buy the real McCoy, the same diskette that major software publishers, computer manufacturers and diskette marketers buy...and call them ours.

We simply charge less.

### Super Special!

**Store 75 diskettes for only \$5.95!**

Yep, that's right: order 50 Super Star diskettes, add \$5.95 and we'll include a Media Prod ucts DISK MINDER II: a well made unit that we re-impressed with 11 holds 75 diskettes securely and looks nice too!



### The Super Star LIFETIME WARRANTY!

Super Star Diskettes are unconditionally warranted against defects in original material and workmanship so long as owned by the original purchaser. Returns are simple: just send the defective diskettes with proof of purchase, postage-paid by you with a short explanation of the problem, and we'll send you the replacements. Incidentally, coffee stained diskettes and diskettes with staples driven through them don't qualify as "defective."

**WE WILL MEET OR BEAT ANY NATIONALLY ADVERTISED PRICE ON THE SAME PRODUCTS AND QUANTITIES SUBJECT TO THE SAME TERMS AND CONDITIONS.**

**629 Green Bay Road  
Wilmette, Illinois 60091**

**DISK WORLD!, INC.**

CIRCLE 144 ON READER SERVICE CARD

CIRCLE 130 ON READER SERVICE CARD

# Recordable Optical Disks In the Offing for PCs

BY ARIEL SCHWARTZ

**PHILADELPHIA**—At last year's Videodisk, Optical Disk, and Compact Disk Conference and Exposition, the big news was the advent of CD ROM players for PCs. Over the past year, CD ROMs have become commonplace as read-only devices with 1/2-gigabyte (500-megabyte) capacities. This year's products represented even more remarkable breakthroughs—laser videodisks and optical disks that are recordable.

These video, optical, and compact disk systems act as conventional disk drives for the PC and hold the promise of making the "paperless office" a reality. Anything from documents to X rays to video images to digitized sound can be stored

glass disks appear to be similar to laserdisks, except that the platter is semitransparent. Unfortunately, this digital optical disk format is not compatible with standard CD ROM players and videodisk players or any

that it must rest in a rigid cartridge when you insert or remove the disk (just like the outdated CED disk from RCA).

The Laserfilm disk can be recorded only once, just like conventional photographic process-

**Recordable disk storage technology is already available. Erasable versions of these systems will soon be on the way. As always, computer users will determine which will develop a following.**

other storage system and must be used exclusively with OSI's LaserDrive 1200 units.

OSI says it's shipping the LaserDrive 1200 drives and disks (\$7,500 in quantity with controller card; \$200 for one-sided disks) to OEMs now and will introduce a 5 1/4-inch disk version later this year.

## Laserfilm Multiplies

McDonnell Douglas Corp., long a basic researcher and developer in the field of videodisk technology, has finally emerged from the laboratory—and in a big way. MD's Electronics Company division has introduced a film-based videodisk called Laserfilm that contains more than 30,000 frames of addressable video or 85 megabytes of data storage (equal to 40 hours of compressed audio) on each side of a 12-inch sheet of film. The disk is so pliable

es, but the big advantage to this system comes in the duplication stage. Normally, a videodisk must be replicated using an involved mastering process much like making phonograph records, with copies stamped out from the original. The Laserfilm system allows you to make simple contact print copies from the original using light-sensitive film. This makes the whole copying process much more viable.

McDonnell Douglas has already arranged to use the system for nationwide real estate listings. Disks with color pictures of homes and data about the listings will be manufactured weekly at the rate of more than 1,000 per hour and will be distributed weekly to realtors. This format might replace the current thick, multiple-listing, system catalogs.

Another interesting aspect of



The LaserDrive 1200 unit is a 55-pound DRDW system measuring approximately 5 1/4 by 19 by 2 1/2 inches with built-in power supply and cooling system.

the Laserfilm system is the development of a "PC-on-a-card" that will slide into the Laserfilm player and do away with the need to have a PC controlling it. This capability will no doubt have applications in other areas as well and should be available soon.

The Laserfilm drive, which can read but not write, will sell for around \$2,600 in OEM quantities when available in April. An entire mastering operation can be purchased for somewhere under a million dollars, compared with several million for current laserdisk facilities.

## Endless CDs

The only erasable disk at the conference was shown by Nakamichi, which is best known for high-end audio equipment. Nakamichi's scientists have come up with a technology that will allow 4 1/4-inch, 5 1/4-inch, or 8-inch compact disks to be recorded and erased as many times as desired. The OMS-1000 magneto-optical system varies the power of its laser to alternately read, write, and erase data on the shiny platters. At a cost of \$80,000 for the initial experimental unit, it won't exactly sell out at the stores, but it is the forerunner of upcoming erasable disk technology.

This year's conference, sponsored by Meckler Publishing in mid-December, clearly established the concept that recordable disk storage technology is viable and already available and that erasable versions of these systems will soon be on the way. It will, as always, be left up to computer users to determine which formats will develop a following.



Optical Storage International's removable 12-inch laserdisk cartridges can record up to 1 gigabyte of data on each of its semitransparent, glass sides.

on these systems in vast quantities. The disks can be mass duplicated without any loss in quality, and many can be used on your desktop without the need for elaborate equipment.

Optical Storage International (OSI), a new venture of electronics giants N.V. Phillips and Control Data, has introduced an optical disk drive unit with removable 12-inch laserdisk cartridges. The OSI disk can record 1 gigabyte of data per side and can read the information as soon as it has been recorded—making it a direct read during write (DRDW) system. The



OSI's LaserDrive 1200 stores data as pits (magnified 10,000 times here) burned by laser onto 12-inch cartridge disks. A single human hair is 3,000 times wider.

# WHOEVER SAID, "GOOD THINGS COME IN SMALL PACKAGES"



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## COMMUNIQUE EDITED BY BILL HOWARD

**Nearer, Ma Bell, To Thee**

Because Edward Johnson, a 46-year-old Atlanta computer consultant, believed the fund-raising activities of fundamentalist preachers such as the Reverend Jerry Falwell take advantage of the poor, Johnson programmed his personal computer to dial the Moral Majority's toll-free line, (800) 446-5000, every 30 seconds for eight months, to keep others from reaching Falwell.

Falwell's group eventually detected a high instance of

hang-ups on the line and called in the phone company to investigate. It took less than a month to find Johnson, who was given the option of unplugging his computer or losing phone service. The FBI also became involved, investigating whether federal laws were broken.

The Moral Majority, now part of the Liberty Foundation, contends it lost nearly \$1 million in pledges, according to the *Washington Post*. Johnson countered that Falwell and others prey on the poor and that his computer-generated busy signal

may have given more than one person time to think twice about funding Falwell. Johnson's 68-year-old mother nearly signed over her 150-acre farm in Georgia to an organization run by the Reverend Jimmy Swaggart.

A Southern Bell spokesman says that the case was the first known instance of phone harassment by computer. Although the incident received publicity, to date there have been no PC copycats.

**We're Looking For a Few Good Contributors**

If you've heard something offbeat about the computer world, send us your story. In return, we'll send you \$50 if we use it. Write to *Communiqués PC Magazine*, One Park Avenue, New York, NY 10016; MCI Mail 157-9301.

**Steering in the Right Direction**

What do you do with rejected microchips? Turn them into miniature longhorns. That's



what one Texas company, the I-P-E Group (1906 Rampart Circle, Austin, TX 78758; (512) 339-8136), is doing with its Texas Cow Chip by attaching resistors for feet and horns. It's \$5.95, postpaid.

Next year, look for the Japanese to have a Kobe beef cow chip on the market, using 256K-byte chips, and at half the price—no doubt owing to just-in-time delivery of the resistors as the chips come off the line.

Barefoot or not, don't step in these chips.

**Deep in the Art Of Taxes**

Undaunted by bad experiences using untested mainframes to track 100 million tax returns last year, the Internal Revenue Service has new plans for smaller computers. The IRS says taxpayers in three areas of the U.S. can file their computer-prepared returns via modem this year.

As with any government benefit, there's a catch.

The trial program works only in Phoenix, Ariz.; Cincinnati; and Raleigh-Durham-Fayetteville, N.C. And you have to go to one of seven IRS-approved tax preparers and have them



prepare your taxes. Want to file from your own PC? Sorry, that's still several years off, says the IRS, because of the question of how to sign an electronic return.

Uncle Sam likes the plan because it saves money—returns can be processed faster and more economically. So do you save money? Hardly. In addition to the preparer's fee, there's a \$15-to-\$20 transmission charge.

**Norton Editor Puts the Polish on Programming**

Peter Norton releases a speedy, economical editing tool for program tune-ups.

**FIRST LOOK**

BY WINN L. ROSCH

Introducing a new program editor takes either a foolish promoter, a headstrong program developer, or a demonstrably good product because the market is even more fraught with opinion and prejudice than word processing. Not only does every

programmer have his or her own preference, but programmers fancy themselves software experts and critics, and they usually criticize all such products fiercely.

Peter Norton now enters the fray with *The Norton Editor*. Although he admits the \$50 product is not the most powerful editor available, Norton pegs it as the best buy.

For your money you get a genuinely fast program that zips through source code because it uses every byte of system memory and only swaps to disk when RAM runs out. Editing speed can be further enhanced by a cleverly integrated mouse control system (but a mouse is not mandatory for using the editor).

**Logical Commands**

The command structure is eminently logical—all Ctrl key functions go backward and Alt key functions go forward—and most higher level functions start with the press of a function key. The whole screen is available for viewing except for line 25, which serves as an abbreviated prompt/help system. Of special note is the editor's condensed mode, which suppresses all program lines except those with a character in the leftmost column (generally procedure names), it lets programmers get an overview and instantly zip to the beginning of any procedure.

Not only does *The Norton Editor* have all the normally expected program editor features, it can also handle mundane word processing. Its primary weakness in that area is its rudimentary printer control.

If you're looking for an eco-

nomical editor, *The Norton Editor* is a genuinely good choice. Written in assembly language, it's even compact enough (under 30K) to substitute for abysmal EDLIN.

**PC FACT FILE****The Norton Editor**

Peter Norton  
2210 Wilshire Blvd.  
Santa Monica, CA 90403  
(213) 826-8032

List Price: \$50

Requires: 128K RAM, DOS 2.0, one disk drive.

In Short: A very fast, convenient program editor for C, Pascal, and so forth, with limited word processing abilities.



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■ FROM THE EDITOR'S SCREEN ■ BILL MACHRONE

# MODERN MYTHOLOGY

*The Twelve Labors of Hercules are nothing compared to the challenges facing today's hardware and software manufacturers.*



Third-party manufacturers of PC-compatible products have generally looked to IBM as the Greeks did to the gods on Mount Olympus: the often-temperamental source from which all blessings flow. In the past, the Big Blue Olympian has favored these mortals, encouraging them to develop software and hardware in its image. But now, like the jealous gods testing Zeus's favorite son, the IBM godhead—in two of its many aspects—has set these heroes to some truly Herculean tasks. One such task is that posed by IBM's NETBIOS protocol, which has forced network manufacturers to throw out everything they've known and loved and to embrace the NETBIOS's DOS 3.1 conventions. The reward for their labors is nothing less than permission to continue to compete in the emergent networking market.

Both the network hardware manufacturers and software authors have had the same challenge: Standardize or die. When faced with imminent extinction, it's easy to embrace a few new beliefs. So software products with their own built-in networking or multiuser schemes have fallen by the wayside. Yes, they're valuable niche products but clearly outside the mainstream. So, too, have proprietary standalone network products begun to die on the vine. But, wait, you say. None of the newly standardized products can be physically interconnected. What kind of standardization is that?

That's not the issue, at least not at this time. Right now, you buy one brand of network for connecting your PCs. Whether

it uses coaxial, twisted pair, or multi-conductor cable doesn't much matter. It's far more important that the single-user software you've developed runs on the network. *dBASE III*, *Revelation*, *Team-Up*, and *R:base 5000* all stand ready to serve your multiuser needs. It won't be long before a networked version of *Paradox* appears, too. Remember, though, that all these manufacturers had to scrap whatever adaptations they had already made to older networking schemes so that you and I could run their software on an AST, 3Com, or whatever network. If you choose a network that doesn't support NETBIOS, you're taking your chances.

**APPC** Another jealous god is IBM's Information Systems Group, whose siren song is APPC. That's Advanced Program-to-Program Communications, if you haven't been keeping up with the press announcements. This protocol effectively

lays to rest all the complaints about micro-to-mainframe networking, which currently reduces the PC to pretending to be a dumb terminal when transferring data from a mainframe to a PC. The upward direction under the current system is even worse: The PC simulates a user typing information into fields on a screen. It's downright undignified for such intelligent machines to be conversing in so boneheaded a manner. But even SNA, IBM's Systems Network Architecture (or System for Negotiating Alternatives, depending on whom you talk to), couldn't do better.

APPC frees personal computers from the tyranny of mainframe as intelligent host and PC as dumb slave by extending SNA's protocols. But users pay a dear price for APPC: the considerable overhead created by SNA. Only time will tell whether it's worth this price.

In the past, some readers have objected to our "The 8088 is dead" articles. Well, APPC is the death knell. It takes over 200K bytes of RAM out of your machine, and you haven't even loaded your operating system yet. The kind of memory and speed you'll need to run tomorrow's graphically oriented applications preclude the 4.77-MHz 8088 machines.

APPC makes two additions to SNA, called LU6.2 and PU2.1. You'll be hearing these catchy names a lot in the near future.

LU6.2 is a set of standard communication protocols that allow virtually any product to talk to any other product. That'll get the software gurus busy designing LU6.2 compatibility into their remote





## ■ FROM THE EDITOR'S SCREEN

file access routines. With any luck at all, this compatibility will happen at the operating system level, not at the applications program level. LU6.2 will also get the hardware types working on gateways to interconnect many types of existing networks to IBM's SNA. Ultimately, it will result in SNA-compatible ports on run-of-the-mill PCs. It may not happen for 3 or 4 years, but it'll happen.

**EGALITARIAN COMMUNICATIONS**

PU2.1 has been out for nearly 2 years, but mostly as an IBM internal standard. IBM hasn't released the full specs, but that hasn't kept third-party manufacturers from reverse-engineering the protocols. They've got an incentive to do this because PU2.1 extends the SNA protocols to include peer-to-peer communications. PCs can use it to communicate with one another on a token-ring network as equals, without involving the mainframe that may be connected to the same network. Better still, it puts the mainframe and personal computer on equal footing, as far as the network is concerned. It also allows IBM's System/36 and System/38 processors to communicate more easily with PCs and mainframes.

PU2.1 allows peers to have multiple simultaneous communications with one another, a necessity in parallel processing and distributed processing applications. You may regard developing these applications as more difficult than any of IBM's Herculean tasks, but they're coming. There's a hitch: IBM envisions PCs as having only one communication session at a time, given the lesser power of the machine. There's no way the more forward-looking manufacturers will settle for this, given the horsepower of the next generation of PCs. The 80386 processor will give these machines considerably more power than that of the wheezing System/36.

Too many MIS managers are complacent about the future: They are certain IBM will take care of everything. The third-party vendors have a different view of reality. They'll be pushing the state of the art faster and farther than IBM wishes. They'll endanger or eliminate the class of machines we now call minicomputers.

These tasks will strain these third-party Herculeses, but to hear them talk, you'd

think Hercules attended IBM sales training—there are no problems, just opportunities. The 5 million PCs out there are just empty sockets, hungry for accelerator cards and graphics boards the likes of

which this world has never seen.

No one doubts that corporate computing is coming full circle. The formerly renegade PCs are coming back into the mainstream, but on their own terms. ■

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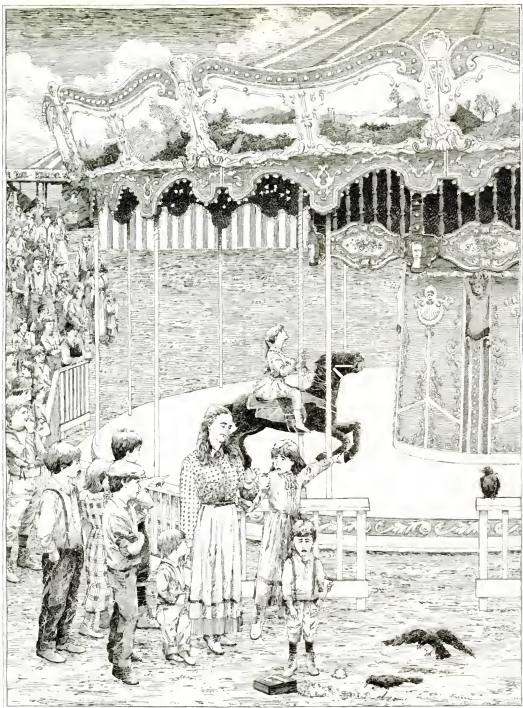
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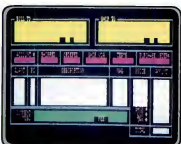
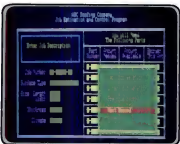
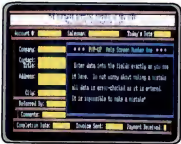
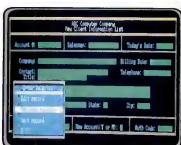
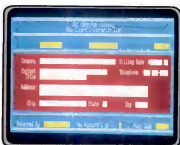
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# CHECKING OUT CHKDSK



*"What the heck can CHKDSK check?" Part of Norton's series on what can go wrong with disks, this column introduces CHKDSK's simpler tests and explains lost clusters.*

**A**fter digressing in my last few columns, it's time to return to my series on what can go wrong with your disks and how to recover lost files.

Since I broke off that discussion to cover topics raised by readers, it's appropriate to pick up our disk odyssey with a plea from the Chicago user group "CACHE" (which you can contact c/o Bill Richrath, 948 Prospect Ave., Elmhurst, IL 60126) to jump into all the issues raised by the DOS command CHKDSK and some of the mysterious things that it reports.

The grand mystery is "What the heck does CHKDSK check on your disks?"

Disks have a logical structure that maps out the directories and files and where they are stored. Like all good logical systems, the structure of a DOS disk has a certain amount of redundancy built in. The duplication of information acts as a safety net: It's something like cross-totalling columns of figures to make sure that the addition is correct. Duplication of data also gives us a way of detecting if something has gone wrong. And that's where the CHKDSK program comes in: It cross-checks all available information about data stored on your disk.

CHKDSK checks out a lot of things on your disks. One thing it does is double-check the size of your files. The disk directory records the size of each file stored on the disk—that's what you see in the DIR listing of the file. That listing, however, only records how big the file is supposed to be. The disk also has a record in the disk's file allocation table, or FAT, of the actual size of the file.

**CONSISTENCY TESTS** Now, a FAT can't tell us exactly how big a file is down to the byte; it does, however, know how big a file is in terms of the disk's clusters, the units of disk space that are allocated to your files. You might not know how many people are in the high school marching band, but if you know how many buses it takes to drive them around, you know roughly how big the band is. Similarly, one of CHKDSK's consistency checks compares the size of each file, as listed in the disk's directory, with the amount of space that the file is allocated through the disk's FAT.

A file should have just enough clusters of disk space to hold its data. Once you know the cluster size of a disk (typically 512 or 1,024 bytes for floppies, 2,048 or 4,096 for hard disks), you can compute the exact number of clusters needed from the file size or compute the approximate file size from the number of clusters occupied.

If the two figures don't jibe, CHKDSK figures that something is amiss on the disk.

That's one of the simplest tests that CHKDSK does on a disk. There are quite a few others that are intricately interrelated. Most—but not all—of them concern checking that there are no parts of the disk space in use by more than one file or, a much more common situation, that there aren't any "orphans," or parts of the disk that are marked as if they belonged to a file when no file actually claims them.

**LOST CLUSTERS** As a general rule, any problem that CHKDSK reports with your disks is bad news; CHKDSK error messages report that your disks are messed up and your data is probably in grave danger. The one exception is the CHKDSK error message that reports "lost" (or orphaned) clusters. Just to make sure that there is no mistaking it, let me quote the message exactly as it appears on your display's screens:

```
xxx lost clusters found in
yyy chains. Convert lost
chains to files (Y/N)?
```

Unless your disk is actually mixed up, this message just tells you that there is some abandoned data on your disk, but the disk as a whole (and the other data stored on it) is not in any danger. If the disk really is mixed up, you'll probably see other CHKDSK error messages as well.

But the lost-cluster error message may leave you wondering what these lost clusters are and how you got them (and what you should do about them).





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## ■ THE NORTON CHRONICLES

The root of this error message lies in the way DOS creates files. When a program puts data onto a disk, it starts by asking DOS to open or create a file, so DOS provisionally sets up the file on the disk. But DOS won't actually set up the file until the program finishes creating it and closes it. Meanwhile, the program will be writing data out to the file, and DOS will be storing the data on-disk. To do that, DOS allocates storage space for the file, setting up an "allocation chain" in the disk's FAT that records where the data was put.

When a file is properly closed, DOS creates a disk directory entry for the file and marries it to the space allocation chain. If the program ends prematurely (say, by doing the old bombola), then the file never gets closed and its allocated space is left hanging as a series of lost clusters. DOS is supposed to keep things neat and tidy by tossing away the chain of allocated space, but it doesn't always. In fact, early versions of DOS often left these lost clusters strewn around.

**HANDLE WITH CARE** Before DOS Version 2.0, programs could ask DOS to look after their files only one way: with what's now called "traditional file ser-

vice," which use a DOS facility called FCBs (File Control Blocks). Starting with DOS 2.0, programs can also use a file-handling facility known as "handles." For some perverse reason known only to the high priests of DOS, if a program drops a file without closing it, the file's space will be orphaned only if it was opened with an

old-style FCB. If the file was created with a handle, DOS will clean up any leftovers, eliminating lost or orphaned clusters.

However, for quite a while after DOS 2.0 and the new handles appeared, a lot of

new programs continued to use the old methods so that they would be compatible with older versions of DOS. Now, the advantages of the newer versions of DOS have become so widely recognized that

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■ As a general rule, any problem that CHKDSK reports with your disks is bad news; CHKDSK error messages report that your data is probably in grave danger.

vices," which use a DOS facility called FCBs (File Control Blocks). Starting with DOS 2.0, programs can also use a file-handling facility known as "handles." For some perverse reason known only to the high priests of DOS, if a program drops a file without closing it, the file's space will be orphaned only if it was opened with an

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## ■ THE NORTON CHRONICLES

only a few holdouts use obsolete versions of DOS. Thus, FCBs have largely disappeared.

What should you do about lost clusters? In the next installment of this series, I'll discuss that and also dig into some of the nastier things that CHKDSK can detect.

**VOLKSWRITER 3** Before ending this column, I want to squeeze in a minireview of some impressive software: the third edition of everyman's word processor, *Volkswriter*. *Volkswriter 3* has taken a big leap forward into the upper reaches of word processing. Readers know that I've been singing the praises of *Microsoft Word* because *Word* is most able to make premier printers, like the HP Laserjet, sing and dance. And while I'm still enamored of that, I'm very impressed with the hot new

■ For statistical typing, *Volkswriter 3* has a very slick live math feature that tidies up your numbers and does cross-totaling (and a lot more calculating besides) for you.

features of *Volkswriter 3*.

I'm most impressed with its beautiful handling of something that's been the bane of office typing since time immemorial: statistical typing. That's the chore of lining up numbers in tables, proofing them to see that the numbers are right, and getting the cross totals right. *Volkswriter 3* has a very slick live math feature that tidies up your numbers and does the cross-totaling (and a lot more calculating besides) for you. The benefit is not that this math feature will do your totals for you—the benefit is that having your word processor do live arithmetic on your numbers is the only realistic way to check that you've typed the right numbers in the first place. Cross-totaling is the numeric equivalent of a spelling checker.

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mention in-document spelling and hyphenation. I'm waiting for the big boys to catch up with this important challenger.

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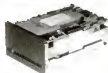
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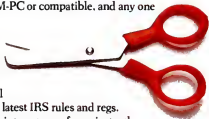
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David Speelman always has a smile on his face when he's talking about the 1/2 inch tape subsystem he purchased from Emerald Systems. He should smile. The subsystem helped him increase his office's monthly revenues by \$50,000.

David is VP of Datacopi, a San Diego company that provides hard copy outputs of mainframe data. Often that data must be "massaged" before it is usable by the big Xerox 9700 laser printers.

"Data usually comes to us on reels of 1/2 inch tape that are generated by a mainframe computer. The Emerald subsystem lets us manipulate the data on those tapes with an IBM AT and be printing within the hour—at a fraction of a service company's fee." (Datacopi has reduced service bureau fees by \$6000 per month.)

"The system's speed is comparable to the speed of the computer at the service bureau, but now we don't have to move tapes around or wait to get on the computer. We cut our lead time from 24 hours or more, to as little as an hour.

Best of all, we have more control over the final format—a few key strokes on the AT changes the output to exactly what we need. And, because a large percentage of our customers are repeats who run similar jobs on a regular basis, we can write batch files. Next time that customer comes in, the AT, the batch file and the Emerald subsystem do all the work."

David found an unexpected benefit in the new subsystem; his company now uploads DOS files for customers, to take advantage of the great speed and graphics capabilities of the \$1 1/2 million Xerox laser printers. "That's a whole new area for us. The ability to upload PC files, the additional control we have over mainframe tape downloading and the reduced turn-around time has given us a distinct 'edge' in our market," beams David. (Datacopi has converted this

"edge" into \$50,000 a month in additional revenues.)

Datacopi uses an IBM PC/AT, an Emerald 70 MByte hard disk subsystem and an Emerald Mainframe-to-Micro 1/2 inch tape subsystem, to accomplish these modern day miracles. The entire system was purchased for under \$20,000 and supports 3 Xerox 9700 laser printers on a daily basis.

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## ■ COMPUTERS IN SOCIETY ■ STEPHEN MANES

# FRITTER: THE EVER-PRESENT ENEMY



*Fritter—wasted time caused by uncooperative software or installation-resistant hardware—is the curse of the computer class. Warning: The fuse you blow may be your own.*

Dear Customer," reads the Xeroxed sheet tucked beneath the foam at the very bottom of the box. "You may blow a fuse in your Monochrome Display in situations where you are switching display modes back and forth between color and monochrome."

Now, I have no idea where to find the fuse in my monitor, and even if I did, I'd be loath to challenge the bright yellow sticker on its underside imploring, in melodious Italian (among four other languages), "Attenzione! Non aprite il coperchio in nessun caso." In other words: "Stick your pinks in here and they may soon resemble deep-fried zucchini."

Still, I plunge ahead with the installation of a graphics card that promises everything from running color and monochrome monitors simultaneously to super-duper color and monochrome enhancements. Then I discover the errata sheet.

"Page 20:

Flicker Free Selector:

OFF position:

IS: the bottom two pins of the three pin jumper

SB: both pins of the two pin jumpers"

Oh, "SB" apparently means "should be." Okay. But yet another loose page, this one a "Jumpers Setting" sheet folded around the errata, reveals schematic drawings apparently drawn by a bright six-year-old. Under the rubric "Flicker Free Mode," a little hand-rendered box representing a jumper clearly surrounds two tiny scrawled circles meant to signify pins—a graphic illustration of the "SB"

condition. Beside it is a clear legend: ON.

George Bush is constitutionally empowered to vote in case of a tie, but he's not in. From the admittedly suspect printed manual, I learn only that "in the Flicker Free Selector's ON position, the display is NOT flicker free." I ignore the jumpers entirely.

Then I discover a note on the back of the errata sheet: "Do not run SCREEN-SAV-ER program." In nessun caso (as they say in sunny Italy) am I about to tempt the Gods of the Fuses, so I make a mental note to turn off my screen protection software (I'm working in *Superkey*) and protect my monitor. Then I fire up the machine.

Amazing! Cursors on both displays, as advertised! More amazing still: The one on the color monitor keeps sliding up the screen. I turn off the machine pronto. A quick consultation with the manufacturer reminds me that the back panel of my display includes a vertical-hold knob. Despite

the comings and goings of a variety of display cards, it has gone untouched till now.

The manual reveals that the video commands of DOS's MODE are useless; in their stead the manufacturer has supplied a floppyful of software. To make *WordStar* display 44 rows and 132 columns, I patch good old WS.COM, fire up a special screen driver, and squint at the tiny main menu on my green screen—along with a message from *WordStar* that it hasn't been debugged fully for such displays.

Not that this matters. The screen keeps flashing at every keystroke, producing instant headache. All I want to do is get back to DOS, but *WordStar* won't let me. Flailing about with arcane key combinations to break the logjam, I accidentally invoke *SideKick*. Every bit of phosphor on the screen suddenly disappears in a puff of green.

The 10 seconds I wait for the reappearance of the cursor seem like 10 eons, but the screen does brighten once more. As an experienced user, I recognize the problem: Evidently (though documented nowhere), you can't mix programs that use different video modes. I try some of the card's more standard settings, and everything works fine on both screens. Then I exit *SuperKey*: The monochrome phosphors vanish again, and a snowstorm rages on the color display.

The graphics card disappears from my machine as fast as I can turn a screwdriver. No harm done, of course. The machine is still fine; my data is intact. Nothing is lost—except the valuable time my computer is supposed to save me. The moni-



## ■ COMPUTERS IN SOCIETY

tor's fuse hasn't blown. My own has.

Fritter—fruitlessly wasted time—is the new curse of the computer class. The sheer number of hours dissipated in installing or understanding even the most rudimentary new product has driven many of us to look upon new hardware and software with gimlet eyes. Enthusiasts who once salivated at the mere appearance of each new package now respond with a nervous tic. We're all too aware that getting the program or equipment up and running is going to entail grief, heartache, intimate involvement with the power switch, and afternoons that have a way of turning into evenings.

If you overhear the words "I wish I had more time," you're undoubtedly listening to somebody who's got a computer. And I'm talking about people who know what they're doing. I've installed (and uninstalled) dozens of programs and peripherals. If I can't make something work without spending the better part of an afternoon, a day, or a week, what chance has the average user whose only interaction with the cover of his machine has been to rest a sandwich on it?

If this country had an Efficiency Expert General, explicit notice would be required on every package of software and hardware: "Warning! This package may be hazardous to your schedule. Time lost in the initial phases of use may never be regained." The Surgeon General might add a warning of his own: "This package is not to be used by those sensitive to extreme exasperation."

Even demo programs intended to whet your appetite for the real thing may make you want to whet a hatchet instead. The makers of a fancy integrated software package recently spent millions of bucks inserting demo disks in a magazine. I slapped the disks in the drives; error messages were all I got.

My machine's switches are set for three floppy drives; the hard disk is D. When a program needs a lot of memory. I don't bother installing my usual RAMdisk; DOS and most programs then treat the nonexistent C drive as Not Ready. But the magazine demo, like too many other programs in recent months, demands that the drive actually exist and refuses to cooperate until you reboot and run RAMdisk software or

open up the machine and reset switches. Other equally stupid programs insist that hard drives be called C. Fritter strikes again.

The sands of time can flow irretrievably down the drain in dozens of ways. Borland's *Reflex* software runs only on a color monitor (in hi-res white-on-black). But if you've got two monitors and try to boot it up from monochrome mode, the thing goes into a dead hang that requires a complete reboot.

I tried to use *Reflex* to analyze my tax records, originally prepared with *PC-File*. In theory, no problem: *PC-File* has all sorts of export formats, and *Reflex* can im-

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■ We're all too aware that getting the equipment up and running is going to entail grief, heartache, and intimate involvement with the power switch.

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port some of them. In practice, no go: *Reflex* is a fussy budget. Since I keep each year's tax records as a separate database, I don't bother including a year in the date field. *Reflex* doesn't like that; upon reading my file, it stuck a random and useless year (including such interesting ones as '06) at the end of each date entry.

I'm sure I could figure out how to get *PC-File* to modify its output to include the date, and failing that, I could write a BASIC program to do the job. Will I? Three guesses.

An upgrade may offer fritter-by-way-of-improvement. In the new relational *PC-File/R*, many of the queries that *PC-File* users have come to think of as second nature must now be entered in different forms. Sure, I can learn to enclose field names in quotes when requesting information. Why must I bother?

The estimable *WordPerfect* program offers the only currently available imple-

mentation I've seen of multiple columns independently reformatable on the screen—an absolute godsend for those who do multicolumn documents such as audiovisual scripts. It also includes a common fritter generator: documentation errors.

The instructions for hard disk installation work fine—until you're asked to copy two files that don't exist and perform a global copying procedure that clutters your hard disk with unneeded duplicate files. If you're a sophisticated user, it's not hard to figure out which files are meant in the first case, or which ones you can delete in the second; it's just another time-waster. If you're a novice, you're likely to endure an extra level of fritter: busy signals from the toll-free hot line.

The "almost there" fritter, of course, has been well documented in the literature. Named for the classic cry uttered by someone who is "just a few minutes away" from completing a program or printing a document in the proper format, it refers to the 5-hour minimum needed to complete the task in question. Programming languages and mail-mergers are particularly suited to generating this particular frustration.

Bug fritter has come to be on the menu of everybody who uses a computer; a dozen new flavors arrive each day. Of late I've run across programs that wipe out DOS upon exiting; programs that confuse erased files with legitimate ones; programs that don't quite mesh with DOS 3.0. Nothing is lost, of course; nothing but time and patience.

And then there's the AT, which produces its own forms of high-speed fritter. Fact fritter: Just try and get a straight answer about whether you can install a high-speed crystal in a late-model machine. Data fritter: Epidemics of hard disk failures can spread through an office like moths through cashmere. Of course, most employees back up their hard disks (of course!), so nothing of consequence is lost.

Nothing but time. Unless, of course, the backup program doesn't work quite right, which happens now and then. Until the damage is rectified, the company cafeteria will feature fritter as a side order to the main dish: copious portions of crow. ■

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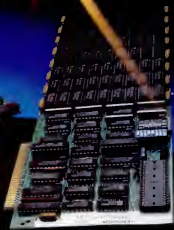
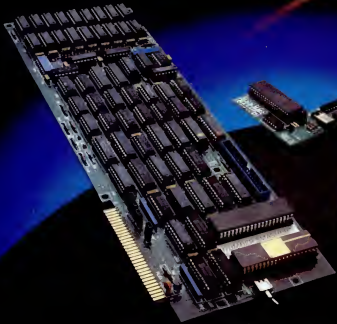
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■ QUANTUM LEAP ■ RON JEFFRIES

# HELLO, REXX— GOODBYE, .BAT



*REXX is a powerful new shell language that's as easy to use as BASIC. It may replace the DOS batch processor in the future.*

Batch files are easily one of the most popular features of DOS. Any PC that's been in use for more than a couple of days has at least a simple AUTOEXEC.BAT file that runs each time the system starts up. Typically, this list of DOS commands gets fancier and more complicated as time goes by and is soon joined by a collection of other batch files that help smooth out all the rough edges of raw DOS.

Although experienced PC users work wonders with batch files (witness the elaborate tricks that appear in *PC Magazine's* User-to-User column), the batch processing capabilities of DOS are severely limited. What's really needed in a batch processor is a full programming language. It should be as easy to use as BASIC, yet have Pascal's structured programming capabilities so you can get rid of the tangled rat's nest of GOTOs found in most .BAT files. The ideal batch language would be simple and powerful, have strong built-in debugging features, and be able to easily control other programs.

Sound too good to be true? It's not: A new language called REXX has all these nifty features and more. A powerful command language, REXX is far superior to most macro processors and is also a darn good general-purpose programming language.

## SIMILAR TYPES OF PROGRAMS

Command program interpreters—called shell, executive, or batch languages—are popular on many modern operating systems. These command programming lan-

guages are used to tailor operating-system commands and other programs to the preferences of a user.

Specialized macro languages are another popular method of modifying the way a program behaves. Macros are used to customize text editors, spreadsheets, database programs, and communications packages. There are a host of different macro languages available on the PC, usually embedded in other programs. Unfortunately, many macro languages have a weird syntax that's difficult for humans but great for the computer.

And finally there's "real" programming, which has more demanding requirements than most command and macro languages.

But if you think about it, there's really little difference in what's needed for a good command language, a good macro processor, or a regular programming language. About the only special requirement

of a command language is that it be able to run other programs and then regain control.

## REXX AS A PROGRAMMING LANGUAGE

Like most versions of BASIC, REXX is currently implemented as an interpreter (although a REXX compiler should also be feasible). REXX was designed to be easy to use, even if in some cases this results in sacrificing machine efficiency. Personal REXX from the Mansfield Software Group runs fast enough on a standard PC for most purposes, although the extra performance you get on the 80286-based AT is certainly welcome. A bigger issue is the hefty amount of memory it needs—over 128K bytes of RAM for the Personal REXX version, although the subset of the language in IBM's PC/VM Bond requires less than half as much memory. Clearly, REXX is part of the rapidly growing collection of software that really needs the extra memory and processing power of the AT, especially when the 640K-byte memory limit in DOS is overcome.

REXX will never replace traditional programming languages such as C and Pascal, which are usually considered best for writing large programs, although it could take the place of the much easier to use BASIC in most cases. But REXX has everything you need to write fairly complicated programs. It supports true subroutines, which can have local variables, and easily handles external REXX routines or even entire programs that are stored as source files on-disk. And since REXX is



## ■ QUANTUM LEAP

also a shell language, it is able to invoke any other program, much as DOS batch files do.

REXX provides the standard stuff needed for structured programming. Its

SELECT statement is similar to CASE in Pascal or SWITCH in C, and it has all the flavors of repetitive loops you'll ever need, such as DO WHILE, DO UNTIL, and DO FOREVER.

A distinctive feature of REXX is the way it handles data types—it is essentially "typeless." Unlike Pascal and C, REXX doesn't make you declare the type of data a variable will hold. Instead, it figures out whether a variable is a number or a character string based on how you use it. It allows you to treat the same variable as a number in one place (for example, when adding it to another number), and then as a character string (for example, when formatting it a certain way for output). This permissive attitude toward variables is much more convenient than the strict approach that Pascal uses.

Another unusual feature of REXX is the way it handles arrays, which are called "compound variables." REXX arrays can have a regular numeric index—like conventional arrays in other languages—or they can be indexed by the contents of a string. In REXX, the subscripts don't have to be numeric. So, you might say AGE.BILL=27, and AGE.CHERYL=25, then print the results with the statement SAY AGE.BILL, which would reply 27 or SAY AGE.CHERYL, which would print 25.

REXX has a large collection of built-in functions, especially for splitting up or "parsing" a line of text into smaller units such as words. With the PARSE statement, text can be matched with any combination of string patterns as well as absolute column locations or relative positions. Compared with what it takes to do the same thing in any other language except SNOBOL, the PARSE statement of REXX really shines.

**THE HISTORY OF REXX** Like most outstanding software, REXX was designed by one person: Mike Cowlishaw. What's a little unusual is that Cowlishaw doesn't work for some obscure little start-up company in Silicon Valley; he works for IBM at its research laboratories in Great Britain and the United States, where he developed REXX as a personal project between 1979 and 1982.

REXX was strongly influenced by the international collaboration made possible by IBM's internal VNET network, which ties together users of over 1,600 computers in 45 countries. Before Cowlishaw wrote REXX, he circulated an informal specifi-

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## ■ QUANTUM LEAP

cation over the network to a small group of other researchers. Only after he revised his design based on their comments did he write the code for the first implementation of REXX.

REXX was distributed over VNET and soon had hundreds of users all over the world. These early converts used the network to tell the author what they liked (and didn't like) about his language. At one point Cowlshaw was getting as many as 350 pieces of electronic mail about REXX per day! An informal REXX advisory committee spontaneously formed on the network. Its on-line discussions eventually amounted to several hundred thousand lines of text.

REXX is one of the first languages that has been directly influenced by the improved communication possible with today's global networks. The large amount of early testing of the language by a wide cross-section of users helped Cowlshaw develop a first-rate new language.

REXX is already almost a cult among advanced users of the VM/CMS operating system on IBM mainframes (one CMS site has over a million lines of REXX code!). REXX has only recently become available for the PC—IBM's little-known PC/VM Bond package includes a subset of REXX, and the Mansfield Software Group sells the full language as Personal REXX.

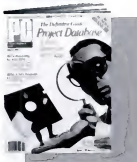
Although REXX is comparatively obscure in PC circles, Prentice-Hall has already published two books on the language—*The REXX Language*, by Mike Cowlshaw, and *Modern Programming Using REXX*, by R.P. O'Hara and D.G. Gromberg. Why did a major publisher even bother to put out two books on a language no one has ever heard of? Well, back in 1978, Prentice-Hall took a flier on another virtually unknown language when it published *The C Programming Language*, by Kernighan and Ritchie. For several years sales of the book were modest, but when the C boom hit it suddenly became a best-seller.

**REXX'S FUTURE** Will REXX become a big deal on personal computers? I sure hope so, because it's just too good to ignore. However, these things are seldom decided on technical merit alone. The outcome largely depends on what IBM and

Microsoft decide to do with REXX. Given IBM's desire to integrate the PC with its mainframes, it seems like a natural to have REXX at both ends of, say, a token-ring network. But Microsoft may have other

ideas, such as simply beefing up the current batch processor. If so, by about Version 49.3 of DOS they may finally get it right. Let's hope they use REXX instead. ■

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## ■ QUANTUM LEAP

also a shell language, it is able to invoke any other program, much as DOS batch files do.

REXX provides the standard stuff needed for structured programming. Its

SELECT statement is similar to CASE in Pascal or SWITCH in C, and it has all the flavors of repetitive loops you'll ever need, such as DO WHILE, DO UNTIL, and DO FOREVER.

A distinctive feature of REXX is the way it handles data types—it is essentially "typeless." Unlike Pascal and C, REXX doesn't make you declare the type of data a variable will hold. Instead, it figures out whether a variable is a number or a character string based on how you use it. It allows you to treat the same variable as a number in one place (for example, when adding it to another number), and then as a character string (for example, when formatting it a certain way for output). This permissive attitude toward variables is much more convenient than the strict approach that Pascal uses.

Another unusual feature of REXX is the way it handles arrays, which are called "compound variables." REXX arrays can have a regular numeric index—like conventional arrays in other languages—or they can be indexed by the contents of a string. In REXX, the subscripts don't have to be numeric. So, you might say AGE.BILL=27, and AGE.CHERYL=25, then print the results with the statement SAY AGE.BILL, which would reply 27 or SAY AGE.CHERYL, which would print 25.

REXX has a large collection of built-in functions, especially for splitting up or "parsing" a line of text into smaller units such as words. With the PARSE statement, text can be matched with any combination of string patterns as well as absolute column locations or relative positions. Compared with what it takes to do the same thing in any other language except SNOBOL, the PARSE statement of REXX really shines.

**THE HISTORY OF REXX** Like most outstanding software, REXX was designed by one person: Mike Cowlishaw. What's a little unusual is that Cowlishaw doesn't work for some obscure little start-up company in Silicon Valley; he works for IBM at its research laboratories in Great Britain and the United States, where he developed REXX as a personal project between 1979 and 1982.

REXX was strongly influenced by the international collaboration made possible by IBM's internal VNET network, which ties together users of over 1,600 computers in 45 countries. Before Cowlishaw wrote REXX, he circulated an informal speci-

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## ■ QUANTUM LEAP

cation over the network to a small group of other researchers. Only after he revised his design based on their comments did he write the code for the first implementation of REXX.

REXX was distributed over VNET and soon had hundreds of users all over the world. These early converts used the network to tell the author what they liked (and didn't like) about his language. At one point Cowlshaw was getting as many as 350 pieces of electronic mail about REXX per day! An informal REXX advisory committee spontaneously formed on the network. Its on-line discussions eventually amounted to several hundred thousand lines of text.

REXX is one of the first languages that has been directly influenced by the improved communication possible with today's global networks. The large amount of early testing of the language by a wide cross-section of users helped Cowlshaw develop a first-rate new language.

REXX is already almost a cult among advanced users of the VM/CMS operating system on IBM mainframes (one CMS site has over a million lines of REXX code!). REXX has only recently become available for the PC—IBM's little-known PC/VM Bond package includes a subset of REXX, and the Mansfield Software Group sells the full language as Personal REXX.

Although REXX is comparatively obscure in PC circles, Prentice-Hall has already published two books on the language—*The REXX Language*, by Mike Cowlshaw, and *Modern Programming Using REXX*, by R.P. O'Hara and D.G. Gromberg. Why did a major publisher even bother to put out two books on a language no one has ever heard of? Well, back in 1978, Prentice-Hall took a flier on another virtually unknown language when it published *The C Programming Language*, by Kernighan and Ritchie. For several years sales of the book were modest, but when the C boom hit it suddenly became a best-seller.

**REXX'S FUTURE** Will REXX become a big deal on personal computers? I sure hope so, because it's just too good to ignore. However, these things are seldom decided on technical merit alone. The outcome largely depends on what IBM and

Microsoft decide to do with REXX. Given IBM's desire to integrate the PC with its mainframes, it seems like a natural to have REXX at both ends of, say, a token-ring network. But Microsoft may have other

ideas, such as simply beefing up the current batch processor. If so, by about Version 49.3 of DOS they may finally get it right. Let's hope they use REXX instead. ■

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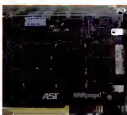
## **Right Place, Right Time, Right People**

If there is a single most astonishing success story in the IBM PC industry, it could be AST's.



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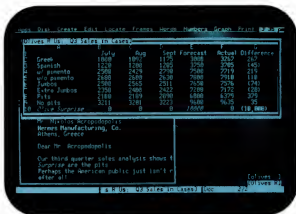
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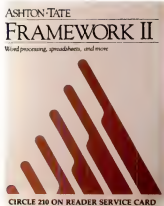
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# Calculator

544.75

√x

%

÷

1—Lotus 1-2-3

G1: +A1\*11235

SUM

A

B

C

1	1	112	1243
2	2	224	2486
3	3	336	3729
4	4	448	4972
5	5	560	6215
6	6	672	7458

DOS=Servi

- Copy
- Print
- Type
- Rename
- Erase

Other

Sort=By

- Name
- Ext
- Size
- Date/Time

Type any

[dir

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Press **Button 2** to return to DOS Services menu.

The DOS commands supported are:

COMP	DISKCOMP	MKDIR	TIME	VOL
COPY	DISKCOPY	PRINT	TREE	
DATE	ERASE	RENAME	TYPE	

PRIME NUMBERS 1-50

PPPPPPPP CCCCCCCC  
PPPPPPPP CCCCCCCC

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Program

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Memory:

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# OPERATING IN A NEW ENVIRONMENT



*Alternative operating environments like GEM Desktop, Microsoft Windows, TopView, and DESQview can speed up your work and give you a break from the DOS prompt.*

It's been 2 years now, and we PC users can finally admit it publicly: When those first advertisements for Apple's Macintosh appeared, we all felt a tinge of envy at what we saw. Next to the Mac's crisp graphics images and easy menus, the PC's display looked like a relic from the past.

Of course the little pictures on the Mac screen were good for some laughs, and the keyboard didn't even have cursor keys. Disk access was slow and a hard disk was unavailable. Software was . . . well, software was forthcoming. Most of us stayed with the PC.

There was no question, however,

that the Macintosh pointed the way to the future. The DOS command-line interface—combining elements from CP/M and UNIX—was useful but hopelessly quaint.

All across corporate America, PC coordinators designed elaborate batch-file menu systems whose sole purpose was to insulate PC users from the traumas of dealing with DOS. As a long-term solution to the person/computer communication problem, the DOS prompt—unintuitive and nonvisual—was clearly inadequate. Something had to be done.

Poking fun at the Mac was easy. Bringing the IBM PC family into the modern age was not.

1	112	1243	11235	1034504	0.285714	0.027777	0.002816
2	224	2486	22470	2069000	0.571428	0.055555	0.005633
3	336	3729	33705	3103512	0.857142	0.003333	0.000450
4	448	4972	44940	4130016	1.142857	0.111111	0.011267
5	560	6215	56175	5172520	1.428571	0.130800	0.014004
6	672	7458	67410	6207024	1.714285	0.166666	0.016901

## ■ DOS ALTERNATIVES

**THE NEW ENVIRONMENTS** IBM's *TopView*, Microsoft *Windows*, Digital Research's *GEM Desktop*, and Quarterdeck Office Systems' *DESQview* are all alternative operating environments. Despite their differences, these systems share a single goal: to abolish the DOS prompt. These operating environments surround DOS with a shell that turns your display into a menu-oriented "desktop" for selecting and running PC applications.

However, these programs are more than simple menu systems. In one sense, an alternative operating environment substitutes for such integrated programs as *Framework* and *Symphony*. By allowing switching, windowing, and cut-and-paste operations among dedicated applications, these systems can give you much of the convenience of integrated programs without locking you into a single package and requiring you to replace your installed applications base.

An alternative operating environment also makes pop-up desktop utilities such as *SideKick* and *Homebase* redundant. *Windows* offers its own versions of these desktop utilities, and the other three systems could run custom-developed desktop utilities. Placing these functions under one central control can eliminate much of the system anarchy that RAM-resident utilities create.

Looking toward the future, alternative operating environments allow specially written applications programs access to a uniform user-interface and menu system. Software manufacturers can write programs specifically for *Windows*, *GEM*, or *TopView* the way they now write programs specifically for DOS. They can take advantage of the extensive facilities built into the operating environment, and (in the case of *Windows* and *GEM*) easily port these programs to other computers running the same system.

Despite their "friendly" interfaces and pretty, easy-to-use menus, these alternative operating environments are not just for computer novices. They're for power users too. By giving you fast access to your programs, allowing you to quickly switch applications or transport data among them, and putting different applications in windows on the same display, an alternative operating environment can easily enhance

your productivity even if you're the most experienced DOS-command-line user.

**TO BIT OR NOT TO BIT** The greatest visual differences among alternative operating environments stem from whether they use a character display or bit-mapped graphics. Both *GEM* and *Windows* use a bit-mapped graphics display reminiscent of the Lisa and Macintosh (which were inspired by the Xerox Star). A bit-mapped visual interface allows more flexibility in using icons, different character font sizes, shadowing, and devices such as scroll bars. *TopView* and *DESQview* use only the standard character set available on the



■ Alternative operating environments surround DOS with a shell that turns your display into a menu-oriented "desktop" for PC applications.

IBM PC with line characters to define boxes around windows and menus.

*TopView* and *DESQview* can run on IBM's standard monochrome adapter and display; *GEM* and *Windows* cannot. On the IBM color/graphics display, *TopView* and *DESQview* can use color, while *GEM* and *Windows* are limited to black and white with some shades of gray. This lack of color in graphics mode is a limitation only of the standard IBM Color/Graphics Adapter. With IBM's Enhanced Graphics Adapter (EGA) (which can display nearly the same resolution as the IBM monochrome adapter with 16 colors per dot), both *Windows* and *GEM* will run in stunning, high-resolution color mode.

The big problem with a bit-mapped graphics display is speed. Each character requires four times as much data in graphics mode as in character mode. Moreover, in a character display, the conversion of an ASCII code into the dot patterns is done by hardware; in a graphics display, it must be done by slower software. If you've become accustomed to instantaneous screen updates, you'll groan when you start using *Windows* or *GEM*.

Since *Windows* and *GEM* use a graphics display, they can make use of icons, which are small symbolic pictures representing files, devices, or functions available. Although *Windows* can make use of icons, its developers have restrained themselves. Each active application and the disk drives are represented by icons, and *Windows Paint* uses them, but Microsoft left more extensive use of icons to third-party software developers that create their own applications.

*GEM* uses icons in its standard display of files on the disk. The icons indicate whether a file is a program (.COM, .EXE, or .BAT extension) or something else. You may also assign more descriptive icons to each file. (For people who can't stand icons, *GEM* can be switched into a mode that simply lists the files as a DOS DIR command would.)

The real advantage to a system like *Windows* or *GEM* is that all the graphics logic is built into the system. Applications specially designed for the operating environment can use graphics without knowing what type of display adapter is hooked up to the PC. These programs access the screen through a set of routines called the Virtual Device Interface (VDI) in *GEM* and the Graphics Device Interface (GDI) in *Windows*.

If they take advantage of it, software developers—who currently must continually adapt their graphics software to each new advanced display that comes around—will ultimately find this feature a big help. In effect, Microsoft and Digital Research have assumed the burden of developing new drivers for new displays.

**CHOOSE ONE COMMAND FROM COLUMN A** Menus have become an almost universal method of command selection in modern programs. Alternative op-



erating environments extend the range of menus: You use them to choose the programs and applications you want to run as well as to select functions traditionally entered as commands at the DOS prompt.

*TopView* and *DESQview* use main menus with descriptions of the applications rather than their filenames ("WordStar" instead of "WS.COM," for instance). Each application program must be specifically installed in order to appear on the menu.

*Windows* and *GEM* take a different approach. They go out to the disk, see what files are there, and display the names in a directory-type list or (in *GEM*) with icons.

Although *Windows* can list directory-type information about the files, its normal mode shows just the filenames and packs up to 90 of them on display. Strangely enough, the Mac-like orientation of *Windows* and *GEM* results in a more conventional view of DOS (your default drive, current directory, what files you have, and what you can do with them) than the "run a program" menus of *TopView* and *DESQview*.

Applications specially written for *Windows*, *GEM*, and *TopView* can take advantage of built-in routines for creating drop-down menus, dialog boxes (fill-in screens with check-off items and data-en-

try lines), and pop-up messages. These routines free third-party software developers from writing their own menu logic and help achieve a uniform user interface on the PC.

**YES, THERE'S A MOUSE** Clear off some room on your desk. You'll find it hard to resist a mouse when you work with an alternative operating environment. (For more information on mice, see "Building a Better Mouse Interface" in this issue.)

The mouse is an all-purpose pointing device. In a menu, you use it to select one of the menu choices. In a word processor or notepad, you use it to mark the cursor position or block out text to move or copy. In a paint program, you draw with it. In a windowing system, you use a mouse to move the windows, size them, and scroll them.

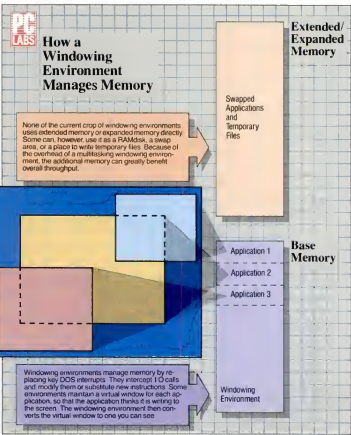
The most popular mouse for the IBM PC is made by Microsoft and has two buttons. *GEM* and *Windows* generally stick to using just one of them. You distinguish different types of operations with single and double clicks. (A double click is pressing the button twice in quick succession.) Applications specifically written for *GEM* and *Windows* can take advantage of a mouse with two or three buttons.

*TopView* and *DESQview* use three mouse buttons. On a two-button mouse, you simulate the third button by pressing both buttons at the same time.

While it's certainly easier to use the mouse when you're starting off, these systems offer almost full functionality from the keyboard. If you eventually find that a mouse does slow things down, you can put your mouse aside and keep your hands on the keys.

**WINDOWS BY WINDOWS ET AL.** *TopView*, *Windows*, and *DESQview* (and a forthcoming new version of *GEM*) can display different applications in different windows on the screen. You can move windows around the screen, resize them, and hide them from view. *TopView* and *DESQview* use overlapping windows; *Windows* uses tiled windows for different applications and overlapping windows for dialog boxes and messages.

Windowing works best for programs specifically designed for the operating en-



## THE NO-FRILLS APPROACH

*WindowMaster and APX Core Executive are low-profile environments.*

**I**n early 1984, when Quarterdeck Office Systems' *DESQview* was only a single-purpose *DESQ* and *Microsoft Windows* was lost in a vaporware fog, Indian Ridge Enterprises' *WindowMaster* and Application Executive Corp.'s *APX Core Executive* were the only multitasking windowing environments available. Both of these pioneers are still around. Although they offer many of the same features as the four other programs reviewed in this article, neither *WindowMaster* nor *APX Core* has a Mac-like graphics interface. *WindowMaster* is menu-driven and *APX Core* is command-driven.

*APX Core* allows up to eight applications to run concurrently; *WindowMaster* runs seven. In both cases, you can tile or overlap windows, cut and paste from one application to another, create macros, and, with varying degrees of success, have programs that write directly to the screen remain within their windows. Although a fully populated IBM PC with a hard disk is strongly recommended for both programs, it is possible to run either one on a floppy-based system with a minimum of memory.

Neither *WindowMaster* nor *APX Core* is totally memory resident, and some features (such as *WindowMaster*'s user-defined menus and *APX Core*'s auxiliary programs) require specific files to be on the default drive.

*WindowMaster* is the friendlier of the two programs. It allows the creation of user-defined menus, permits color setting for each window, and provides on-line, context-sensitive help. If you need all of your system's memory, you simply exit the program. *WindowMaster* does have its design faults, though. Because of the menu implementation, executing a simple DOS command such as *DIR* can be quite a chore. You can use macros to simplify navigating through the sea of menus, but it would have been much nicer to be able to toggle back and forth to

DOS without losing *WindowMaster*'s concurrency.

*APX Core*, on the other hand, appears to be a programmer's answer to multitasking. Its developers took a bare-bones approach: *APX Core* offers no menus, no colors, and no on-line help. If you need memory, you must reboot. What it does offer, however, is a familiar interface. If you already know DOS and feel you can afford to learn a few more commands, *APX Core* can increase your productivity quickly and effortlessly.

**METING OUT MEMORY** *WindowMaster* allocates memory dynamically—that is, as the applications are executed (the program itself takes 60 bytes). If you

their memory allocations, is added at the command line as a parameter. Each application gets an equal slice of the CPU's time. If you were to run *CHKDSK* within each of the equal-sized windows, the amount of total memory would decrease from one window to the next.

Each *APX Core* window acts as a separate PC, complete with its own *COMMAND.COM* file and system date and time. When you change a drive's directory from within a window, you are changing it for that window only. This feature brings certain disadvantages. If you open your session with only two windows and then decide you need more windows, you must reboot the system. Also, each environment is forced to operate within the memory allocated it, and killing an application in a window does not free its memory for another window.

While *APX Core* sets multitasking through a utility called *APXUtil*, the background application does not update the screen. Thus, you are forced to occasionally swap tasks simply to learn the status of the background program. Swapping from one window to another is accomplished by pressing a combination of the Alt key and a number that reflects the window assignment. Unfortunately, there is no way to visually distinguish the windows.

In *WindowMaster*, each window has a distinct color and the background task is updated on the screen. However, switching from one window to another is no small feat. You must first return to the main menu (Alt-F1), select Window Management (F3), select Change Windows (F7), and then scroll through the active windows until you finally reach the one you want. The keystrokes can be saved in a macro, but then you have to memorize an additional combination of keystrokes.

*WindowMaster* allows you to set two different types of macros. The first is similar to the type offered by keyboard

### ■ While neither *WindowMaster* nor *APX Core Executive* has a graphics interface, both offer concurrency.

want, you can limit the amount of RAM a program can take when you set it up as an application. If you run *WindowMaster*'s memory status module or the DOS *CHKDSK* command in any of the windows, they show the same amount of total and free memory. If one of the applications running in a window needs more memory, you kill one of the other programs and use its allocation. Each window receives a share of the CPU's time in round-robin fashion.

*APX Core* partitions the system's memory; the size of the smallest window allowed is 48K bytes plus whatever is required for the application. The number of desired windows, along with a ratio for

macro programs; the second creates batch, or script, files to be run from within *WindowMaster*. Over 50 macros of up to 1,000 keystrokes in length can be defined. With the script files, you can set intervening menus off, pause for a specified length of time, and accept user input. *APX Core*'s Keysave command allows you to create 16 macros with up to 16 levels. Each macro has a limit of 1,024 characters. Both of these programs allow the use of specially designed AUTOEXEC files.

Data transfer in *APX Core* is simply a matter of hitting the Alt-T combination, marking the block of data, and defining the source, the target, and an optional end-of-line character. The same task in *WindowMaster* is much more complicated, but the latter program does offer more flexibility. You can transfer data manually or automatically and with or without filters. However, a word of warning: When manually transferring data from one window to another, have your lunch ready—you will spend an inordinate amount of time accepting, deleting, or inserting individual characters as the data scrolls across the 25th display line of the destination file.

Both *WindowMaster* and *APX Core* have trouble with applications that are memory-resident or reconfigure the system. While *APX Core* crashed when I called *SideKick* from a window it wasn't invoked from, *WindowMaster* simply refused to allow the program to load, mistakenly stating that there was insufficient memory available. RAMdisks and other such memory-partitioning utilities pose their own particular problems. If loaded prior to the windowing programs, a RAMdisk can be used by all of the applications and/or environments. When a RAMdisk is loaded from within a window, *APX Core* allows only the application in that window to use the feature. *WindowMaster* just crashes.

Both *WindowMaster* and *APX Core*

deal with ill-behaved programs (those that write directly to the screen) in essentially the same manner. The default is to put them to sleep when in a background window. *APX Core* does include a separate program, called *APXRun*, that creates run files for monitoring such programs, but the results are mixed. It also provides a complete set of driver files for setting 1-2-3 to run under a task. *WindowMaster* offers an option for running a DMA-based program in windows, but it assumes you know how the program misbehaves and will plan accordingly. (*WindowMaster* also allows you to run CP/M-86 programs.)

Usually, the degradation that occurs in the background applications is acceptable for both programs. However, when I ran the test program *WSB.COM* (a 16-line *WordStar* configured for the IBM BIOS) with *WindowMaster*, the screen updating was so bad that at times the cursor was two words behind the letter being output to the screen, which, in turn, was a few words behind the word being typed. At other times, the cursor hung just over the right margin, waiting for the next line to be entered.

The *WindowMaster*'s 8½-by-11, letter quality documentation leaves much to be desired. Because every page is busy, no important pieces of information stand out. There is no index, glossary, centrally located list of commands, or specifications page. *APX Core*'s documentation is divided into three sections: user manual, application kit for 1-2-3, and program interface manual. Each section contains its own index, and command summaries are located in subsections.

The version of *WindowMaster* that I reviewed (1.4) included a business graphics feature. Among the charts it can plot are line, clustered bar, scatter, and pie. Data can be pasted in from other applications and saved. This feature, along with a word processor and name and address database, will be sold as a

separate program in the new version.

While neither environment offers as many features as *Microsoft Windows*, both do provide concurrency. Which of the two is better largely depends upon your needs and tastes. *WindowMaster* can be configured for end-user ease of use; *APX Core* offers the familiar DOS prompt. However, at its new price of \$29.95, *WindowMaster* is definitely worth the money. If, after playing with its windows, you don't like what you see, close the curtains.—**Vincent Puglia**

*Vincent Puglia is a frequent contributor to PC Magazine.*



## FACT FILE



**APX Core Executive**  
Application Executive  
Corp.  
600 Broadway, #4C  
New York, NY 10012  
(212) 226-6347  
List Price: \$95  
Requires: 50K RAM

plus 5.5K per task (256K recommended), one floppy drive (hard disk recommended), DOS 2.1 or later.

**In Short:** A command-driven, multitasking operating environment with a restrictive memory-allocation scheme.

CIRCLE 606 ON READER SERVICE CARD



**WindowMaster**  
Indian Ridge  
Enterprises Inc.  
508 Second St.  
Oakland, CA 94607  
(415) 268-1631  
List Price: \$29.95  
Requires: 128K RAM

(512K recommended), two floppy drives (hard disk recommended), DOS 2.0 or later.

**In Short:** A no-frills, multitasking operating environment that uses menus for an easy-to-use interface.

CIRCLE 607 ON READER SERVICE CARD

## ■ DOS ALTERNATIVES

vironment. However, *TopView*, *Windows*, and *DESQview* can put existing "well-behaved" programs in a display window. (A well-behaved program is generally one that does not write directly to the display. This includes most small DOS-like utilities and some database management programs.)

In practice, this process does not work very well if the program does a lot of screen updating. The operating environment has to intercept the normal BIOS screen calls, determine whether the text being written falls within the dimensions of the window, and then go through its own driver to actually write to the display. *Windows*'s display driver must also convert each character to dots. For some existing applications, this process makes screen updating almost intolerably slow.

Most existing spreadsheet and word processing programs write directly to the display. The operating environment can still run these programs, but it must give them the entire screen. *DESQview*, however, performs the amazing feat of windowing even programs that write directly to the screen. It can perform this magic only with specified programs, but the results are nonetheless interesting. M. David Stone will have more to say about this slick trick in his review of *DESQview*.

**MUNDANE MULTITASKING** Multitasking is the technique of quickly switching between two or more programs so they seem to be running simultaneously. Mainframe computers have been multitasking for years, and people naturally get a big kick out of seeing a small computer do the same thing.

However, while multitasking on a single-user PC may seem glamorous, it is usually not very important. How often do you actually wait for your PC to do something? Printing is the worst case, but print buffers, the PRINT command, and many word processors already print in the background. Perhaps sorting and indexing a database or compiling and linking a program ties up your PC for a long time. If you don't mind the same job taking about twice as long (in real time), multitasking may help out.

*TopView*, *DESQview*, and *Windows* can all multitask well-behaved programs.

When a program writes directly to the display memory, the operating environment must suspend multitasking because it has no idea when the display will be updated. (Again, *DESQview* is an exception here when it handles some special programs.)

Switching among several programs is probably much more important on a PC than multitasking. Alternative operating environments can switch among most programs, even those that are not well behaved. Very simply, one program is suspended while another one is started up again. You can go back and forth between your spreadsheet and word processing program simply with a few keys or mouse-button clicks.



■ The real power and value of an alternative operating environment can be revealed only by programs specially written for the system.

If you haven't already discovered that 640K bytes is an inadequate amount of memory, you will if you load up a 150K- or 200K-byte operating environment and several large applications programs at once. To get around this problem, *Windows* and *DESQview* have a built-in virtual memory scheme that can swap programs from memory to disk and back again while switching between them. Swapping goes much faster with a RAMdisk. If you've been wondering what use you could possibly make of a megabyte-sized RAMdisk in AT extended memory or Lotus/Intel/Microsoft expanded memory, program swapping under *Windows* and *DESQview* programs is one.

**PIF THE MAGIC FILE** An alternative operating environment that allows windowing, switching, or multitasking needs to know some intimate details about existing applications. It obtains this information from the program information file (PIF), a 369-byte file that tells the system everything it needs to know to execute a program and what it should keep track of when multitasking or switching.

Although the PIF format was developed by IBM for *TopView*, Microsoft adopted the PIF for *Windows*, and *DESQview* can read PIFs. The PIF is really the only common standard among these different systems. Some PIFs come with *TopView* and *Windows*, others may come with new applications that you buy, and you can make your own PIFs as well.

PIFs can also duplicate some of the functions of batch files. The PIF directs the alternative operating environment to the drive and directory where the program is located, specifies the default drive and directory that should be in effect when the program is loaded, and indicates what parameters should be passed to the program. If you use a question mark parameter in the PIF, the operating environment will prompt for one.

**THE THREE-FINGER SALUTE** Some people stick with a few standard applications. They don't bother with resident programs, and they never play around with DEBUG and POKE. If the above description fits you, you may not be accustomed to having your computer crash—to suddenly finding that your keyboard is frozen or to watching the screen fill up with garbage. You may not even be aware of the two different types of crashes, the soft crash (recoverable by the three-finger salute, Ctrl-Alt-Del) or the hard crash (big red switch and count to 5 slowly).

Be prepared: All the alternative operating environments reviewed here crash sometimes—not because they are inherently unstable, but rather because they must deal with existing programs that have probably never been tested in a multitasking environment.

A particular program may have an unknown bug in which a wayward pointer writes over a few bytes in upper memory. Nobody has ever discovered it because it

never caused any damage. Under an alternative operating environment, it may be writing over another program or part of the system code. Some smaller utilities expect to have 64K bytes of memory available and might not even check that the operating environment may have allocated far less.

When you first start working with an alternative operating environment, save your work frequently, particularly before you load other programs or switch among them. Don't worry about the crash problem; just be aware of it.

**MADE FOR EACH OTHER** The real power and value of an alternative operating environment can only be revealed by programs specially written for the system. Applications written by the manufacturers and third-party vendors will determine the ultimate commercial success of these systems. First-rate spreadsheet programs, word processors, database managers, graphics programs, and communications packages will be essential for any of the alternative operating environments to fully surpass DOS.

*TopView*, *Windows*, and *GEM* all have associated programmer's development kits for writing these applications. (See the sidebar, "Tools for Programmers" for a discussion of these programmer's kits in detail.) In one sense, these programmer's kits are as important as the systems themselves.

In the early days of the IBM PC, some people predicted that Microsoft's MS-DOS and Digital Research's CP/M-86 would both have widespread use as PC operating systems. In retrospect, this idea is ridiculous. It's tough enough for software to support different machine configurations. But two different operating systems as well?

Consequently, it seems likely that only one of these alternative operating environments will survive. If none of them makes it, then something else will. The Macintosh proved that a command line interface is unnecessary and antiquated. The once-ubiquitous DOS prompt may be a dying breed.—Charles Petzold

Charles Petzold is a contributing editor of PC Magazine.

# DESQVIEW



*Not only can Quarterdeck's DESQview display well-behaved programs in windows, but its special load files also let you window popular applications like WordStar and 1-2-3.*

**D**ESQview, from Quarterdeck Office Systems, is the slimmed-down, speeded-up little brother of DESQ, an alternative operating environment that has been around for some time (see "DESQ: Through an Open Window," PC Magazine, Volume 3 Number 7). Although its name may not be as familiar to you as that of *TopView*, *GEM*, or *Microsoft Windows*, DESQview is one of the stronger contenders in the alternative operating system field, and it's worth a close look.

Both novices and power users will appreciate the extent to which DESQview is easy to learn and use. The ease of use begins with an installation procedure that involves little beyond typing "install" and following a few instructions on-screen.

One noteworthy touch for those who have hard disk systems is that DESQview's Install program searches your disk for programs that DESQview already knows how to deal with. If it finds any filenames it recognizes, it automatically installs DESQview for those programs, noting the subdirectory that the file is in and listing the program name on the DESQview menu. The programs that DESQview automatically installs include such perennial favor-

ites as *WordStar*, *WordPerfect*, *Microsoft Word*, *SuperCalc 3*, and 1-2-3.

Recognizing that you may have a file that might happen to have the same name as a commercial program, Install ends with a warning to check the programs on the DESQview menu. If you see any programs listed that you know are not on your hard disk, you can simply delete them from the list.

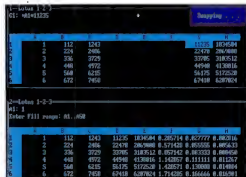
The Install program puts all DESQview files in a single directory and creates one batch file, DV.BAT, which it puts in the root directory. The purpose of the batch file is to automatically switch to the DESQview directory and start the program.

As the documentation explains, you can set the Path command to include the root directory. If you then type DV at any time, the system will find the batch file and load the program. Alternatively, if you already have a directory on your system devoted to batch files, you can move the DV.BAT file there.

**INTUITIVE COMMANDS** Once installed, DESQview is as simple to use as you could hope for. DESQview wakes up

Load files let programs like 1-2-3 run in windows.

If the files are small enough, DESQview can manage several at once, each in its own window. If the templates are too large to be held in memory at once, DESQview swaps the background window to disk each time you switch.



## ■ DOS ALTERNATIVES

with a menu of nine choices, which are divided into groups of two and three, making them easy to read. Choosing from the menu is simple: Either use a mouse to point and click or type a single keystroke at the keyboard—O for open a window and Q for quit, for example. This intuitive command logic is consistent throughout *DESQview*.

When you start the program, the only options that work are Quit, Help, and Open a window. The other choices assume that one or more windows are already open: Close a window; Switch the active window; Rearrange position, size, and color of windows; Zoom the active window to full screen or back to partial screen; and Mark and Transfer text between windows.

The Help option gives you an index of *DESQview*'s commands. Choose a command from the index, and the program will give you a short explanation of how the command works. The explanations are scanty, but they are enough to get you started without reading the manual.

**OPENING WINDOWS** Normally when you load *DESQview*, the first thing you'll want to do is open a window to run a program. Pick the Open a Window option, and *DESQview* presents you with a list of the programs and other windows for which

it has been installed. The menu will display a maximum of 16 choices at a time, but paging through the list of choices requires only one keystroke or one mouse click per page.

The "open a window" menu will also let you add a window to the list, delete a window, or change the program information file for any window. The program in-

■ Using *DESQview* isn't that different from using DOS, except that you can open as many as nine windows at once and run a different program in each window.

formation includes such details as how much memory is set aside for the window and whether the window can run in the background or be swapped to disk.

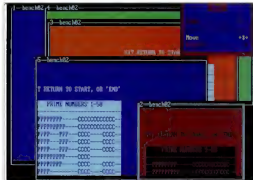
I use the term window very carefully here. In most cases, *DESQview* windows

are installed for particular programs. When you open a window, the program automatically switches to the proper sub-directory and then loads the requested program. In some cases, however, it makes much more sense to use a window for creating a desired "environment" without loading a program.

As shipped, *DESQview* is installed with one such window, labeled "DOS (128K)." As the name implies, this window takes you to the DOS prompt and reserves 128K bytes of RAM. Through this window you can issue all the standard DOS commands or call up programs that can run in 128K.

This feature is essential if you have a program that you want to use conveniently in more than one directory. For example, you may want to separate your word processing files into groups, putting each client's files in a different directory. *DESQview* will let you set up a window that will use the settings for your word processing program but will send you to a DOS prompt instead of loading the program. You can then use DOS commands or batch files to move to the appropriate subdirectory and call up the word processing program from the DOS prompt.

Using *DESQview* isn't all that different from using DOS, except that you can open as many as nine windows at once and run a



True concurrency gives you the ability to use a computer for two or more functions at once. Here, *DESQview* is running a PC Labs benchmark test in each of five windows. *DESQview*'s setup program lets you designate how much of the time slice to give to foreground and background windows.



The *DESQview* main menu on the right overlays a WordStar window; WordStar is another program *DESQview* can run in windows via its special load files. Here, we used *DESQview*'s transfer feature to move text from window 1 (WordStar) to window 2 (WSA, a patched version of WordStar).

different program in each window. The effect is much like having nine computers on your desk and being able to switch among them.

Of course, as you open more windows, you will quickly run out of memory, but *DESQview* sidesteps that problem by swapping information to and from disk. The time spent swapping is tolerably fast with a hard disk and is even better with a RAMdisk using the Lotus/Intel/Microsoft Expanded Memory Specification.

**FUTURE FEATURES** Quarterdeck has another trick up its sleeve: The next release of *DESQview* allegedly will be able to work with the AST RAMPAGE expanded memory board, allowing you to assign up to 550K bytes of RAM for each window. Given 2 megabytes or more of usable memory, most users should rarely have to swap windows to disk. According to Quarterdeck, the new version of *DESQview* will be bundled with the RAMPAGE board and should be available by the time you read this.

Even without the RAMPAGE board, power users will be impressed by *DESQview*'s concurrency capability. You can perform such feats as using a communications program to receive files while simultaneously writing a letter with a word processor or copying files with DOS.

My favorite *DESQview* trick is running *ProKey* in two windows, using different applications and a different set of macros in each. You can also run *SideKick* in its own window, which allows you to call up *SideKick* without stopping concurrent operations.

**GOOD BEHAVIOR** *DESQview* has another impressive feature that gave us a major surprise during the PC Magazine Labs tests on alternative operating environments.

Windowing environments like *DESQview* are supposed to work with "well-behaved" programs that go through DOS to put information on-screen. They are also supposed to work with programs that have been specially designed to take advantage of the particular operating environment. They are not supposed to work well with programs like *WordStar* or *1-2-3*, which put information on-screen by taking con-

trol of the hardware directly.

In the PC Labs tests, we expected *DESQview* to run *1-2-3* and *WordStar* but only in full-screen windows. If these programs were to behave as predicted, running them in small windows or as background programs concurrently with other windows would mess up the screen. We were wrong on all counts.

■ With *DESQview* you can use a communications program to receive files while simultaneously writing a letter with a word processor or copying files with DOS.

*DESQview* can work with active *WordStar* windows and *1-2-3* windows of any size, and it can keep the windows working in the background. At one point during testing, I had *1-2-3* running in four windows, none of which interfered with any of the others. Processing stopped in a window only when it was swapped to disk because of lack of memory.

Unfortunately, *DESQview* manages to perform this trick only in special cases. *SuperCalc 3*, for example, works fine as a full-screen program, but *DESQview* cannot restrain it so that it works properly in a small window. Instead, it has to suspend operations.

*WordStar* and *1-2-3* work because *DESQview* has written special files for them and because the automatic Install feature sets up the windows to use those files (these special files are available for only some of the programs that *DESQview* automatically installs). The "load" files are read into memory along with the programs, effectively converting them into "specially designed" programs. If you run *WordStar* and *1-2-3* without the appropriate load file, they become as unruly as we originally expected them to be.

**PLUSES AND MINUSES** *DESQview*'s other useful features include a macro capability that can take the place of *ProKey* or any other keyboard enhancer. Computer novices still wary of the DOS command line prompt will be grateful for the menu-driven DOS utility, and power users will appreciate the ability to sort directories by name, extension, date, or time. Quarterdeck gives registered users a calendar and alarm clock utility as an incentive for registering the program.

Be aware, however, that *DESQview* has some important limitations. For example, you cannot print files from two windows at once. If you send it such a command, *DESQview* will simply print a little from one window and a little from the other, yielding a mess at the printer.

More troublesome is *DESQview*'s tendency to crash in technicolor flames if you haven't installed programs correctly. On my first attempts to use *SideKick*, I assigned too little memory to the window. As a reward, *DESQview* wiped out my system's setup information, forcing me to load my diagnostics disk and run setup again.

Even with these problems, *DESQview* has much to recommend it. Quite simply, it is a productivity tool that is long overdue. It lets me do more work in less time, and that's why I bought a computer in the first place.—M. David Stone

M. David Stone is a frequent contributor to PC Magazine.

**FACT FILE**



**DESQview**  
Quarterdeck Office  
Systems  
150 Pico Blvd.  
Santa Monica, CA 90405  
(213) 392-9851  
List Price: \$99.95  
Requires: 512K RAM  
(640K recommended), one disk drive.  
**In Short:** An easy-to-use, powerful operating environment that successfully runs popular software in windows, switches between programs, and runs DOS commands.

CIRCLE 699 ON READER SERVICE CARD



## ■ DOS ALTERNATIVES

# TOPVIEW



*TopView may benefit casual users who run only a few standard applications in a PC environment, but anyone more familiar with DOS is likely to find it frustrating.*

**I**BM's *TopView* is most useful in PC environments with several standard applications and not much DOS command use. Since this description characterizes many communal PCs in office settings, *TopView* may be a good replacement for those batch-file menu systems often installed on office PCs to insulate casual users from the DOS command level.

But *TopView* has such fundamental problems in duplicating DOS functions that I cannot recommend it as a full-fledged alternative operating environment. While *TopView*'s multitasking, windowing, and switching capabilities are solidly designed, the program erects so many barriers to fundamental DOS operations that anybody accustomed to using DOS will probably find it too limiting and frustrating for full-time use.

**BUILDING THE MENU** Installing *TopView* on a hard disk only requires running a batch file. The opening *TopView* screen lets you choose to run the tutorial if you want. (The tutorial covers mostly mouse and menu usage; see "Mouseketutor," *PC Magazine*, Volume 4 Number 9.)

After you've installed *TopView*, your work begins. *TopView*'s main Start a Program menu is supposed to list your applications with English-language descriptions (rather than filenames) so that you can easily pick one with the mouse. Initially, however, the menu lists only DOS Services as a runnable program. You must select Add a Program from the menu to begin installing specific applications. You must even specifically install the calculator and alarm clock programs included with *TopView*.

The Add a Program menu lists 38 decidedly unpopular programs, including the IBM Assistant series, *EasyWriter 1.15*, *VisiCalc 1.2*, the 3101 emulator, and 17 programming language compilers (all

IBM rather than Microsoft releases). These are programs for which *TopView* has preset program information files (PIFs).

For other programs, *TopView* will use default PIF settings that you'll probably want to fix up by selecting the Change the Program Information option. To help out with these changes, more recent copies of *TopView* include PIF descriptions for non-IBM programs in a separate applications guide. This is a compendium of many very obscure programs (such as Gillogy Software's *Computer Chef 2.11*, to pick one almost at random) along with a few essentials (*1-2-3*, *dBASE II*, and *Crosstalk XVI*).

The PIF determines how much memory *TopView* will give a program and whether *TopView* will run the program in a window or give it the full screen. *TopView* supports windowing and multitasking of well-behaved and *TopView*-specific programs. The windows are overlapping and can be moved, sized, or hidden from view. The active window is always topmost. *TopView* can also switch between programs that are not so well behaved, such as those that write directly to the display.

*TopView*'s multitasking is very good

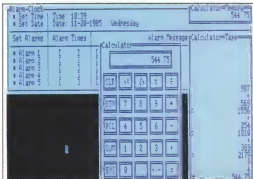
and smooth. It exacts less than a 10 percent overhead (in execution time) for each multitasked program. I was also very pleased to see *TopView* prevent two programs from printing at the same time. *TopView* will recognize most RAM-resident pop-up or keyboard-enhancement programs loaded before *TopView* is started, but you can't load them once you've got *TopView* running.

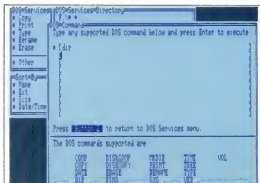
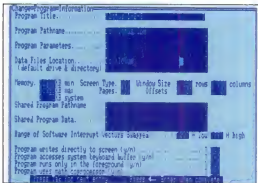
**TOO MANY CLICKS** You'll find that *TopView* requires about twice as many menus and mouse clicks than seem necessary. For instance, switching from one program to another is a three-step job: Click button 3 to bring up the *TopView* menu, click button 1 on Switch to bring up the menu of currently running programs, and click button 1 on the program to which you want to switch. Even if all the programs you're currently running are displayed in windows on the screen, you still have to go through this sequence to move from one to another.

Here's another example: Only 19 programs can be displayed at one time on the Start a Program menu. If you have more than that, you get to learn how to scroll the program list: First, click button 3 to bring up the *TopView* menu, then select Scroll by clicking button 1. Now pull the mouse up and down the list to scroll it. When you come to the right selection, click button 2. Now proceed.

**CUT-AND-PASTE MYSTERY** One of *TopView*'s features allows cutting and pasting among applications. For instance,

*TopView includes an alarm clock and calculator program. In this screen, the double line indicates that the calculator is topmost and active. The alarm clock works concurrently, keeping track of time while other programs are running.*





The Program Information File (PIF), developed by IBM for TopView, is quickly becoming a standard component of alternative operating environments. TopView's Change the Program Information option lets you edit the PIF. This PIF shows an installation of 1-2-3.

Selecting the Other option from TopView's DOS Services menu lets you type in selected DOS commands and programs. To run commands not sanctioned by DOS Services, you need to install programs as applications or run COMMAND.COM under TopView.

you can cut out a table from a spreadsheet program and paste it into a memorandum in your word processing package.

The TopView manual makes cutting and pasting look very easy. If you actually try it, you'll find that it doesn't work. TopView can copy text from the screen with no problem, but except for a few special programs, it won't let you even select the Paste option from the menu.

The answer to this puzzle is in the TopView Programmer's Tool Kit. To support pasting, the PIF must contain FILTER.EXT as a "shared program" and a filter table as "shared program data." The filter table, which controls the keystrokes mimicked during the pasting operation, is very easy to set up using an ASCII text editor, but you have to buy the TopView Programmer's Tool Kit (\$395) to learn the secret codes. Unless you're doing TopView-specific programming, the rest of the Tool Kit is worthless.

This filter table can also let the mouse control the cursor for non-TopView-specific programs such as 1-2-3. You'll find in practice that this function doesn't come close to giving you the control you'd have using the Mouse Menu utility that comes with the Microsoft Mouse. If you run a non-TopView-specific program that uses a mouse under TopView, such as Microsoft Word 2.0, TopView will keep control of the mouse and won't let Word use it.

**WHAT HAPPENED TO DOS?** TopView's most significant deficiencies lie in duplicating normal DOS functions. The DOS Services menu includes facilities to duplicate the commonly used commands DIR, COPY, TYPE, RENAME, and ERASE. But except for DIR, it does not support wildcard (\*) and (?) filenames. Nor can you copy and erase a whole subdirectory. Copying one file involves clicking button 1 at Copy, selecting the file to copy by moving the mouse and clicking button 1, entering in the name to copy to, and clicking button 2 when it's done to return to the DOS Services menu.

The DOS Services menu also gives you a list of other supported DOS commands that you can directly type in. (No, you can't pick one from the list with the mouse, logical as that would be.) Here, fortunately, you can use the COPY, RENAME, and ERASE commands with wildcards. But you'll find a few omissions. For instance, you cannot remove a directory or set a PATH. Also, many external DOS commands (such as FORMAT, CHKDSK, BACKUP, RESTORE, RECOVER, MODE, EDLIN, and DEBUG) must be installed as applications before you can run them.

No command or program run within TopView (either in DOS Services or on the menu) allows redirection of standard input and output or piping. No DOS 3.x function

calls are allowed. (Most DOS 3.x programs will run, but not the ones that use specific 3.x calls.) Programs that use ANSI.SYS for the screen display will not work right. Possibly TopView's worst fault is its inability to run batch files. If the only thing your batch files do is change directories, then you can duplicate that in the PIF file. But you can't install a batch file as an application.

**JUST LOAD COMMAND.COM** Of course, you can always run COMMAND.COM from within TopView just like any other well-behaved program, right? You

**PC FACT FILE**

**TopView**  
IBM  
1000 N.W. 51st St.  
Boca Raton, FL 33432  
(305) 982-2690  
List Price: \$149  
Requires: 256K RAM  
(512K recommended).

DOS 2.0 or later, two disk drives.  
In Short: A cumbersome operating environment that successfully handles multitasking, windowing, and switching but frustrates the user by making normal DOS functions difficult to execute.

CIRCLE 796 ON READER SERVICE CARD

## ■ DOS ALTERNATIVES

can run all your batch files, execute the missing DOS commands, and use redirection of standard I/O, right?

Well, not really.

*TopView* has a tough time finding `COMMAND.COM` if you've reset the `COMSPEC` with the `SET` command. Once you get that straightened out, you'll find out what happens when *TopView* balks at DOS 3.x-specific function calls. With `COMMAND.COM 3.1`, *TopView* flipped back and forth between the DOS prompt and the message that it can't handle DOS 3.x. The only way out was a `Ctrl-Alt-Del` reset.

Under `COMMAND.COM 2.1` (I tried taking a step backward), my carefully constructed ANSI prompt appeared as a string of gibberish. *TopView* does not support ANSI.SYS. Before *TopView* came out, I was under the impression that using ANSI.SYS for screen control was the right way to create a program that would run under any generic MS-DOS 2.x system under any environment—in a network, linked over phone lines to an ANSI terminal, and in a multitasking system. I wrote a large program using ANSI screen control with these eventualities in mind. This turned out to be one of the few programs that cannot run under *TopView* under any circumstances. Somebody made a big mistake here, and I don't think it's me.

More shocking, however, is that redirection of standard I/O doesn't work under *TopView* even on the DOS command level. You can enter

```
DIR>DIRFILE
```

and *TopView* will still display the directory on the screen instead of directing it to the file. It lets `COMMAND.COM` create `DIRFILE` on the disk, but the file is empty after the directory is finished.

When I saw that, I actually felt embarrassed for IBM. If this lack of support for redirection was accidental, it means that IBM's engineers don't have an understanding of DOS internals. If this lack of support was deliberate, then it was an act of malice. If this was an oversight, it suggests that IBM's software testers must use DOS on a very rudimentary level. If they recognized the problem but didn't know how to get around it, then they haven't read the *DOS Technical Reference* man-

ual. (Hint to *TopView* programmers: Use the `IOCTL` function call.)

When I tried out `EDLIN`, I discovered that the DOS editing key (F3) wouldn't recall the line I was editing. Instead, it recalled the previously typed line number. This was amusing because I once wrote a DOS intercept resident program that had the same quirk. I was able to fix mine, though. What's the problem here?

**WHAT KIND OF OPERATING SYSTEM IS THIS?** The problem is that *TopView* is trying to do too much and is failing at it. It takes over screen output calls and keyboard requests on the DOS level rather than letting them pass through DOS and intercepting them on the BIOS level. It's not letting DOS do all the good stuff that Microsoft has built into it. Even if you tell

*TopView* that a program writes directly to the screen and can run only in the foreground, *TopView* will still intercept its display calls and slow the program down.

If *TopView* prohibits you from doing very basic normal DOS functions unless you load `COMMAND.COM` and then alters the basic workings of DOS when you do, you're left with no choice but to exit *TopView* entirely. An alternative operating environment shouldn't have to be exited.

At one time it was believed that because *TopView* already had a large chunk of an operating system built into it, IBM was going to usurp Microsoft in providing DOS to PC users. This turned out not to be true, and we can all breathe easier. My experience with *TopView* has convinced me of one thing: We're much better off with Microsoft writing DOS.—Charles Petzold

# MICROSOFT WINDOWS



*Microsoft Windows is finally a reality after 2 years of delay and an enormous capital investment. Is Windows worth it? Yes—but not, perhaps, for the reasons you might think.*

**L**ike all alternative operating environments, *Microsoft Windows* is a command shell that loads after DOS and takes control of the machine. Through *Windows* you can run applications programs and—within some strict limitations—move information between them. DOS is still there; *Windows* simply puts a new face on DOS and uses DOS to do some of its work. If you like, you can open a direct window into DOS and use the normal DOS command line.

*Windows* broadens the bandwidth of the PC user interface. Ordinarily, you and PC-DOS communicate by way of a single line on your screen. The other 24 lines go to waste, except as short-term memory retaining what the command line has already printed. Like most alternative operating environments, *Windows* puts the entire

screen to work passing information between you and the computer.

The DOS Executive Screen is a good example. DOS Executive is displayed anytime you aren't running a specific program—it's the equivalent of the DOS command prompt. But the Executive displays the disk volume name, the current path, and all files in the current directory. If any other programs are currently loaded into memory (rather than still residing on disk as files), they are displayed as icons in the icon bar at the bottom of the screen. All this information is available at a glance—you never need to request it.

The use of a mouse further improves the speed of the user interface. If a program's name is displayed on the screen, you point the mouse pointer (a little graphics arrow symbol) at the filename and click

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the mouse button twice. *Windows* immediately executes the program. You don't have to remember the name of the program or how to spell it, and you don't have to type its name.

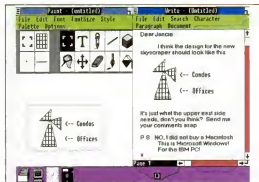
**WINDOWS\*WINDOWS** *Windows* uses "tiled" windows: multiple windows on the screen that do not overlap but share screen area. If you have one window occupying the entire screen and open a second window, typically the existing window shrinks by half, allowing the new window to occupy the other half of the screen. You can temporarily "zoom" either window to occupy the entire screen, and then shrink it back to its prior size. Or you can use the mouse to set a new proportional relationship between the windows, giving one window two-thirds of the screen and the other one-third, for example.

*Windows* divides applications programs into two groups: those that use the PC BIOS for screen output and can therefore run in a window, and those that write directly to the PC screen and therefore cannot run in a window. These days, most applications access the screen directly. This bars them not only from running in a window but from utilizing *Window's* excellent machinery for moving text and graphics from one window to another. When two

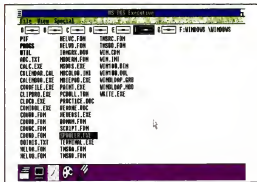
applications are running in concurrent windows, you can highlight text or (in some cases) graphics with the mouse, move the mouse cursor to the second window, and paste the highlighted material into an appropriate place in the second window. The sluggish screen speed of well-behaved (that is, windowable) applications being legendary, I suspect people will make little use of this feature, except in moving data among Microsoft's supplied desk accessory programs (Paint, Calculator, Cardfile, Notepad, Terminal, and Write).

Neither multitasking nor windowing

Two of the applications included with Windows are a calendar and calculator. The calendar can display a daily or monthly schedule, and if you set an alarm, it will alert you to imminent appointments.



*You can create images with Paint, the graphics program included with Windows, and paste them into documents created in the Windows word processor, Write. When working with applications that are not Windows-specific, you can transfer some text and data (with in the limitations Windows imposes), but not graphics.*



Microsoft Windows's MS-DOS Executive menu lists all files and subdirectories on the current drive and directory. You can change drives by clicking the drive icon, change directories by clicking the directory name, and run programs by clicking the filename. The icons at the bottom represent Windows applications that have already been loaded.

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## ■ DOS ALTERNATIVES

**ADVANCED GRAPHICS** The least-understood feature of *Windows* may be the one most important to the PC industry: its graphics VDI (virtual device interface). One factor retarding the growth of graphics-based applications is the difficulty of supporting many different graphics screen and output devices from within a single program. Writing graphics drivers is laborious and expensive. Within *Windows* itself is a set of standard entry points into a powerful suite of graphics primitives. Any program written to *Windows*'s specs can use them, and the graphics primitives function identically no matter what graphics devices the user has installed on his system. In effect, graphics software vendors no longer have to write graphics drivers at all, nor must graphics software vendors update their software as new and more powerful graphics devices come along. Microsoft is encouraging graphics hardware manufacturers to include *Windows* drivers with their products and is helping them write such drivers.

**DROWNING IN FLOPPIES** Microsoft claims that *Windows* can operate in a floppy-based system; that's true in the same sense that you can bail a swimming pool dry with a teaspoon. *Windows* takes up more than half a megabyte of disk storage, so if you use it on floppies you're in for an endless waltz of "Insert the applications disk in drive A:." In practice, 10 megabytes or more of disk storage is essential.

*Windows* can be installed on mouseless systems, but the same warning applies: It makes things slower and more complicated. What *Windows* does require is graphics. As shipped, *Windows* supports the IBM Color/Graphics Adapter in high-resolution graphics mode, various graphics modes and monitors using the IBM EGA, and the Hercules graphics card. Drivers exist for other graphics boards.

*Windows* claims to run in 256K bytes of RAM, but again, "run" means different things to different people. In my experience, 640K RAM is essential, and a significant quantity of extended memory (either AT extended RAM or AboveBoard-style RAM) makes *Windows* both faster and more powerful.

Installing *Windows* on a properly equipped PC, XT, or AT is rather easy,

thanks to generally excellent documentation and a well-designed install program. The software is distributed on four double-sided 360K floppy disks. Installation involves running a program called SETUP and answering questions. SETUP copies about 100 files from the distribution disks into a subdirectory it names *WINDOWS* on your fixed disk. Nothing is added to your CONFIG.SYS file or your AUTOEXEC.BAT file.

Screen resolution and CPU speed are *Windows*'s two basic performance issues. *Windows* on the Color/Graphics Adapter has a coarse, fuzzy feel to it. The EGA's 640-by-350-pixel color mode, by contrast, is striking, and *Windows* on a Macintosh-quality 730 by 1,004 monochrome display is nothing short of spectacular. The more resolution you feed *Windows*, the easier *Windows* is to use for long periods of time.

The graphics resolution problem compounds the CPU speed problem. If you're used to text screens refreshed at RAM speed, *Windows* will be a disappointment. Drawing windows and refreshing the graphics text in Notepad and Write take a long time by comparison. Most people will say that any screen refresh that can be watched takes too long. Very little happens too quickly to see in *Windows*.

When you're working with only one major applications window, the quality of EGA graphics makes the speed of *Windows* executed on a PC AT with an EGA

acceptable. Most people are likely to find *Windows* far too slow on an ordinary 4.77-MHz PC or XT.


Opening a second window, however, slows matters down infuriatingly. (This doesn't apply to running a small desk accessory like the clock or calculator in a second window.) If available memory does not allow both open windows to run from memory at once, one application must be kept in virtual memory, and the resulting thrashing as *Windows* alternately loads one application and then the other brings the machine to its knees.


**LOOKING AHEAD** *Windows* strains the limits of current PC hardware. Even the AT has less to offer than *Windows* would like, and the poor PC just can't do *Windows* justice. But many 8- and even 10-MHz AT-compatibles are becoming available (some are reviewed in this issue; see "Computing Options for Power Users"), and the Intel 80386 is now a reality. RAM cost has dropped to virtually nothing—with a megabyte costing only a little over \$100. Graphics displays are improving constantly—the Microdisplay Systems Genius VHR offers a portrait-format 730 by 1,004 monochrome raster for only \$1,500. For once, a software concept has leapfrogged ahead of current hardware technology, but only a little ahead.

Software written for the *Windows* interface, oddly enough, reached the market before *Windows* itself did: MicroGrafx's *In-A-Vision*, a marvelous little CAD system, has been on sale for several months using an encapsulated version of the *Windows* interface to enable it to stand alone. There is more on the way.

For all the heat it has taken for being late, Microsoft must be cheered for taking the time to do *Windows* right. *Windows* is not for everyone, and I cannot recommend it for use on the PC or XT. But if your work depends on graphics of any kind—for CAD, presentations, desktop publishing, or anything else—get *Windows* now. *Windows* is the face DOS will wear in the future. For once, you have time to prepare. —Jeff Duntemann

Jeff Duntemann is an editor of PC Tech Journal.

**FACT FILE**



Microsoft Windows  
Microsoft Corp.  
10700 Northup Way  
Box 97200  
Bellevue, WA 98009  
(800) 426-9400  
(206) 828-8080  
List Price: \$99

**Requires:** 256K RAM (640K recommended),  
two disk drives (hard disk recommended),  
DOS 2.0 or later.

**In Short:** This multitasking operating environment's best features are its ability to turn ordinary applications into memory-resident utilities and, for software developers, its graphics virtual device interface.

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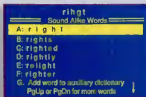
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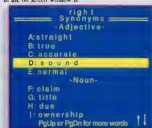


So you move your cursor to "A," which is the right "right," hit Return and the spelling mistake is instantly fixed. And the program you were working on has continued to run while you did a little spelling sidetrack with Turbo Lighting. (If you'd rather not remember how spelling grids are altered, the beep might make you mad, but you can choose the whole page "silent" which means that when you finish writing the entire page, any spelling mistakes will be highlighted. The go to and straighten things are straight ones.)

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## TOOLS FOR PROGRAMMERS

*Getting the most out of the software development kits for TopView, GEM, and Microsoft Windows takes patience and hard work.*

**I**n the personal computer industry, "proprietary" is often a synonym for "dead." A closed system quickly becomes forgotten history, while an open system has a shot at becoming a PC standard. Much of the success of the alternative operating environments reviewed in this issue will depend upon applications developed by third-party software vendors.

Although most existing applications can run under *TopView*, *Microsoft Windows*, and *GEM*, only a program specifically developed for the system can take advantage of the built-in routines for creating menus and dialogue windows, reading the mouse, and (in the case of *Windows* and *GEM*) using display graphics. Because *Windows* and *GEM* implement a device-independent graphics interface, programs developed for the IBM PC versions of these operating environments should be easily portable to other completely different computers that may now (or someday) run the same operating environment. For software manufacturers, this is probably the most tantalizing aspect of these systems. (Programming for *TopView*, however, means that you'll be sticking to the IBM PC family.)

IBM, Microsoft, and Digital Research have all made available programmer's software development packages for *TopView*, *Windows*, and *GEM* with hefty manuals and disks full of sample programs and utilities. These kits are not, I'm sorry to say, for the weekend programmer. Be prepared to grapple with hundreds of system functions and learn some new concepts.

### PROGRAMMING FOR TOPVIEW

IBM's *TopView Programmer's Tool Kit* consists of a one-volume 570-page manual, two disks, and a *Windows* Design Aid for creating menus and data-entry panels. All of the programming examples are shown in assembly language.

Pascal is relegated to an 11-page appendix, but it's supported on the disks with sample programs and the necessary assembly language subroutines.

The *TopView* interface is through the software interrupt 15h, but if you're writing in assembly language, you'll probably want to take advantage of the macros provided with the kit so that you won't have to remember all the numbered function calls.

Programming in languages other than assembly or IBM Pascal may take some

work. Most recent language compilers support direct software interrupt calls, but this will not help much. Before making most *TopView* calls, your program's stack pointer must be assigned by *TopView*: You make a special *TopView* call to set the stack pointer, make the *TopView* call, and then call *TopView* a third time to restore the original stack pointer. Since many compilers use the stack extensively for local data and passing parameters to subroutines, you'll run into problems using a compiled language's software interrupt facilities. Programming for *TopView* in a language other than assembler will probably require special assembly language subroutines for the *TopView* calls.

The manual is weak on examples. Fortunately, the disks include the complete 20-page assembly language source code for the Alarm Clock program included with *TopView*. This source listing will be your primary learning tool.

For debugging, IBM recommends the *IBM Professional Debug Facility* (\$150), a resident program with a full-screen display that works best when run on a separate monitor. Only a two-page appendix in the *TopView Programmer's Tool Kit* is devoted to debugging. The easiest method is to directly code an Interrupt 3 instruction as a breakpoint. Since the *Professional Debug Facility* is not a symbolic debugger and cannot display original source lines, it may be difficult to use with Pascal programs or other compiled languages.

**CREATING WINDOWS APPLICATIONS** The *Windows Software Development Kit* has 975 pages and eight disks (plus four more with the *Windows* runtime system). It is heavily oriented toward C programming and currently includes an updated version of Microsoft C Compiler, Version 3.0, to correct some

(continues)



### FACT FILE



**TopView Programmer's Tool Kit**  
IBM  
1000 NW 51st St.  
Boca Raton, FL 33432  
(305) 982-2690  
List Price: \$429  
Requires: 256K RAM,

two double-sided disk drives, DOS 2.0 or later, *TopView*.

**In Short:** This package is heavily oriented toward assembly language programming. The manual is weak, but its 20-page example of source code is a good learning tool.

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**Windows Software Development Kit**  
Microsoft Corp.  
10700 Northup Way  
Box 97200  
Bellevue, WA 98009  
(800) 426-9400  
(206) 828-8080

List Price: \$500 (includes *Microsoft Windows*)

**Requires:** 512K RAM, IBM CGA or EGA or Hercules Monochrome Graphics Card, DOS 2.0 or later, mouse.

**In Short:** Although heavily oriented toward C and difficult to debug, this is a complete and useful development kit.

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## ■ DOS ALTERNATIVES

(*"Tools for Programmers" continued*)

Windows-only problems. The disks include special replacement libraries for this compiler. All of the manual's examples and all but one of the sample programs on-disk are written in C. The kit also includes a replacement library for the Microsoft Pascal compiler, one sample Pascal program, and a macro file for assembly language programming.

In line with C tradition, the *Windows* programming guide begins with a program to display "Hello Windows" in a window. But while the beginner's C program that displays the message "Hello World" is typically four lines long, the Hello Windows program is three pages long and requires a resource file, definition file, and icon file along with the usual C program.

This first program introduces 20 of the 400 *Windows* routines available to your programs. Several more programs shown in the manual illustrate the use of graphics and fonts and are explained in detail.

Any 80K-byte header file must be part of every *Windows* C compilation. Although this may seem excessive, it's done with a real eye toward the future. By religiously following normal C portability rules and using the conventions established in this header file, your programs should someday be easily portable

to other systems that run *Windows*.

Much to my surprise, the *Windows* interface on the PC is not through a software interrupt. Instead, the special linker (LINK4) creates a new format .EXE file. All the calls to *Windows* procedures end up in the .EXE file with dummied far intrasegment addresses. *Windows* uses a separate reference table within the .EXE file to insert the actual routine addresses

■ These development kits are not for the weekend programmer. Be prepared to grapple with hundreds of system functions and learn some new concepts.

at load time. Although other compiler manufacturers can obtain information from Microsoft concerning methods to hook into *Windows*, this approach will initially be a major hurdle for users who want to write for *Windows* in other language or use non-Microsoft compilers.

For debugging, *Windows* requires "an external terminal connected to COM1." Don't have one? That's OK—a spare PC will work just as well. The *Windows Software Development Kit* includes Microsoft's symbolic debugger SYMDEB as well as modules and symbol tables for constructing a special debugging version of *Windows*. *Windows* cleverly passes messages back to SYMDEB so that SYMDEB can match up the symbol tables to the correct segments.

Other utilities include MAKE (a program maintainer), ICONEDIT (for making icons, cursors, and other bit-mapped objects), FONTEDIT (for customized fonts), DLGEDIT (for designing dialog windows), and a program called Luke Heapwalker—it doesn't battle the Empire, but it does display how memory is allocated within *Windows*.

The *Windows Software Development Kit* is a good complete package for the adventurous C programmer.

### THIS GEM NEEDS POLISHING

When you purchase the *GEM Programmer's Toolkit*, don't leave the computer store without also buying some printer paper and perhaps a new ribbon. Although the manual is 500 pages long, much essential information is contained in about 100 pages worth of document files on one of the three disks that come with the package.

The printed manual, intended mostly for reference, is divided into two sections: VDI (virtual device interface) for graphics and AES (application environment services) for menus and mouse. The manual is very nearly device-independent and can be used for *GEM* programming reference on non-PC machines; all the IBM-specific material was put into disk files.

These files are partially in *WordStar* format, partially 80-column right justified, and partially ragged right; they have no table of contents and no index. Sometimes they break into first-person narratives, as if they were merged together from several different sources. Some of the source code listings are sprinkled with what my C compiler calls an illegal \x8A character. That's what happens if you accidentally edit and save a source code listing in *WordStar* document mode. The disk document files and sample programs, in short, are sloppily put together.

On the IBM PC, programs use software interrupt Efh for communicating with *GEM*, but you won't want to use the interrupt directly if you're concerned about portability. Instead, you'll probably be programming for *GEM* in C and linking with provided C subroutines (written for the Lattice C Compiler) that in turn call provided assembly language subroutines to make the software interrupt. The on-disk documentation states: "You may use another compiler but extensive rewriting of the *GEM* bindings may be required." These revisions will depend on your compiler's calling se-

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### FACT FILE



#### GEM Programmer's Toolkit

Digital Research Inc.  
60 Garden Court  
Monterey, CA 93942  
(800) 443-4200

List Price: \$500 (includes *GEM Desktop*)

Requires: 512K RAM, IBM CGA or EGA or Hercules Monochrome Graphics Card, DOS 2.0 or later, mouse.

In Short: Sloppily assembled on-disk documentation files make this C-oriented software development kit difficult to use.

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quence, register use, and naming conventions. (They will not work unaltered using Microsoft C, Version 3.0, for instance.)

Fortunately, the assembly language files are provided in both Microsoft/IBM ASM format as well as Digital Research's own A86 format. You can also program for GEM purely in assembler. The disks include batch files for assembling, compiling, and linking the sample programs. Obviously, you'll want to scrap these and set up MAKE files for maintaining GEM applications.

The package includes ICONEDIT (for creating icons) and two programs for debugging: a special version of Digital Research's *SID* (symbolic debugger) and a public-domain TRACE program.

**WHAT ABOUT THE REST OF US?** All three program development packages leave BASIC and Turbo Pascal users out in the cold. For *TopView* and *GEM*, you might be able to work in some assembly language routines for access to the system functions. Eventually, someone is going to figure out a way to hook into *Windows* from a Turbo Pascal or BASIC program, but this sloppy hook will be a holy terror to debug.

I was both amused and disturbed to find that while both *Windows* and *GEM* aim for device-independent operating environments and easily portable source programs, Microsoft and Digital Research have created programmer's kits that are actually compiler-dependent.

A BASIC interpreter that allowed access to the internal routines could be the push that would make one of these systems really take off. It would make the system an "everyman's" operating environment as well as give more-experienced programmers interactive practice and experimentation with the system functions.

Meanwhile, if you want to stay current and explore these new operating environments by programming for them, you're going to have to learn C—and the *Windows* and *GEM* programmer's kits will tell you which C to buy.

—Charles Petzold

# GEM DESKTOP



*GEM Desktop isn't the answer for power users, but it is a useful tool for switching between its easy-to-use applications.*

**I**f you can't understand why anyone uses anything less than an AT with a 20-megabyte hard disk and an Enhanced Graphics Adapter, maybe you should stick with *TopView* and *Microsoft Windows*. But if a lesser system meets your needs, Digital Research's *Graphics Environment Manager (GEM) Desktop* might just be for you. Priced at under \$50, the *GEM Desktop* package costs less than some "command shells" like *Idir* and *Pathfinder*.

What you see when you boot up *GEM Desktop* depends on which version you have. In the version available at the time of this review, the *GEM Desktop* screen consists of up to four overlapping windows, icons representing the disk drives placed along the right side of the screen, and a "menu bar" that runs across the top of the screen. When you move the pointer (with the mouse or cursor movement keys) to a word in the menu bar, the appropriate menu drops down. Moving the pointer to a line in the menu and "clicking" (hitting the mouse button, or the Home key if you don't have a mouse) selects a command. To see your subdirectories and files, you move the pointer to a disk icon and then double-click.

Apple Computer decided that the look of this interface and some of the other *GEM* applications had more than a passing similarity to the Macintosh's interface and threatened Digital Research with a lawsuit. In an out-of-court agreement, Digital Research promised to make some changes to *GEM Desktop* and other *GEM* applications.

**A NEW LOOK IN '86** The new version of *GEM Desktop*, scheduled to be shipped during the first quarter of 1986, will look only slightly different when you boot it up. Instead of up to four overlapping windows, it allows only two fixed-size, tiled windows. Either can still zoom to fill the screen. Digital Research expects

users to keep a "source" and a "target" window or to work from a single large window.

*GEM* won't lose any features, but some of its procedures will change. Instead of dragging selected files to the trash bin, you erase them by making a menu selection. Instead of opening a new directory by making a choice from the menu bar, you double-click a "new folder" icon in the upper window. Some menus and menu items have been renamed, and the disk icons now appear in the windows rather than outside them.

Whichever version of *GEM* you're working with, double-clicking a program icon (.EXE, .COM, .BAT, or special *GEM .APP* files) will run that application. After asking you for any command arguments for the program, *GEM* clears the screen and the program runs normally. *GEM* will remain in memory, consuming 150K bytes, but is dormant while the program is running. (You can reduce this overhead during installation.) Since *GEM* is so unobtrusive, it should be able to run nearly anything. But because it's so inactive when applications are running, *GEM* can't support cut-and-paste from the screen and certainly doesn't let you run different programs at the same time.

When the program is finished or you've quit, you're returned immediately to *GEM Desktop*. Programs like CHKDSK that display some data and then exit are tough to use from *GEM*; the display disappears too fast to be read. Unfortunately, there's no way to ask *GEM* to pause before clearing the screen.

If you double-click a data file and you've installed an application to go with it, *GEM* will run the program with the selected data file. For example, if you've installed *BASICA.COM* to use files with an extension of .BAS, double-clicking *SIEVE.BAS* in *GEM* would be like typing *BASICA SIEVE.BAS* in DOS. This

## ■ DOS ALTERNATIVES

### Alternative Operating Environments: Summary of Features

Feature	Top View	DESQview	Microsoft Windows	GEM Desktop
Price	\$149	\$99.95	\$99	\$49.95
Supported display adapters	IBM Monochrome, IBM Color/Graphics Adapter	IBM Monochrome, IBM Color/Graphics Adapter, Hercules Monochrome, Paradise, AST Preview	IBM Color/Graphics Adapter, IBM EGA, Hercules Monochrome	IBM Color/Graphics Adapter, IBM EGA, Hercules Monochrome
Supported pointing devices	Microsoft Mouse, Mouse Systems Mouse, Maynard Maytrix Mouse, Summagraphics SummaMouse, Torrington Mouse, FTG Light Pen, Kraft Joystick	Microsoft Mouse, Mouse Systems Mouse, LogiTech LogiMouse, VisiOn Mouse	Microsoft Mouse, Mouse Systems Mouse	Microsoft Mouse, Mouse Systems Mouse, Summagraphics SummaMouse
Utility programs included	Calculator, Alarm Clock	Alarm Clock/Appointment Calendar, Macro Definition	Clock, Calendar, Write, Paint, Notepad, Cardfile, Clipboard, Print Spooler, Terminal	Calculator, Clock, Print Spooler
Separately purchased programs	None	None	None	GEM Write & GEM Paint (\$199 w/Desktop); GEM Draw (\$249 w/Desktop)
Number of files installed on disk	42	56	93	25
Disk space of installed system	440K	500K	1,460K	500K
Memory space used by system	140K	150K	200K	150K (20K if application needs it)
Tutorial included	Yes	No	No	No
Type of display	Character	Character	Bit-mapped	Bit-mapped
Color or shading choice	Yes	Yes	Yes	Yes w/EGA
Windowing	Overlapping	Overlapping	Tiled	Overlapping
Window operations	Size, move, zoom, hide	Size, move, zoom, hide	Size, move, zoom, icon	Size, move
Application overhead	Install for each	Install for each	Pick from DIR list	Pick from DIR list
Uses PIF files	Yes	Yes	Yes	No
Duplication of DOS commands	Most	Most	Most	Most
Batch file support	Must load COMMAND.COM	Yes	Yes	Yes
Can load COMMAND.COM	Yes (but not 3.1)	Yes	Yes	Yes
ANSI.SYS support	No	Yes	Yes	Yes
I/O redirection support	No	Yes	Yes	Yes
Resident program support	No	Yes	Yes	Yes
Applications windowed	Well behaved	Well behaved, plus some others	Well behaved	Special only
Applications switchable	Virtually all	Virtually all	Virtually all	Special only
Uses disk for swapping	No	Yes	Yes	No
Applications multitasked	Well behaved	Well behaved, plus some others	Well behaved	Special only
Cut-and-paste	Virtually all (but undocumented)	Virtually all	Well behaved	None

method is particularly handy if the program and data file are located in different subdirectories (and considerably easier to master than the PATH command).

Installing an application in *GEM Desktop* is a fairly painless procedure and it can even make some programs easier to run for the PC novice or occasional user. For example, to install *BASICA*, you click *BASICA.COM* and select *Install Application* from the options menu. A fill-in-the-blanks form called the installation dialogue box appears on-screen, and you can tell it which extensions the program's data files use and which icons will represent the program and data files in windows. You can't design your own icons; you are forced to choose among the possibilities *GEM* presents.

At this point, you can also tell *GEM* that the program needs full memory. In such cases, *GEM* will reduce its memory overhead from 150K bytes to a modest 20K by running the program as an overlay over itself and reloading itself when the program's done.

*GEM Desktop* is really just one of several *GEM* applications available from Digital Research. It is billed as an "integrator" for these applications, even though it offers no facilities for moving information among them. You can get several of these

applications working together to some extent by importing files from one into another. For example, *GEM Write* documents can include *GEM Draw* or *GEM Paint* graphics.

The full range of *GEM* applications

■ **GEM Desktop is billed as an "integrator" for other GEM applications, though it offers no facilities for moving information among them.**

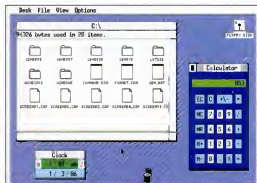
currently offered by Digital Research are *GEM Draw*, an object-oriented graphics program; *GEM Paint*, a bit-mapped graphics program; *GEM Write*, a *GEM* version of *Volkswriter Deluxe*; *GEM Graph*, a business graphics program; and *GEM Wordchart*, a text-only tool for making slides and viewgraphs. Third-party applications are promised for personal finance management, communications, database

management, artificial intelligence, and integrated systems.

**THE HARD FACTS** *GEM Desktop* has modest minimal requirements for hardware, but it can take advantage of extras. On a two-floppy system, *GEM* nearly fills two floppies. If your applications program won't fit on either the disk or your data disk, you'll dance the familiar "floppy shuffle." (Because *GEM* is started from a .BAT file from the startup disk, DOS asks you to put that disk back in drive A: when you exit *GEM*.) Obviously, *GEM* works much better with a hard disk.

All *GEM* applications, including *GEM Desktop*, produce adequate black-and-white graphics on a plain-vanilla Color/Graphics Adapter. Only an EGA will give you high-resolution color graphics. The Hercules monochrome graphics card gives you the highest resolution of all, though without color.

Although a mouse is recommended, *GEM* is surprisingly useful even without one. The manual clearly has a mouse bias; it doesn't tell you until section 4 how the keyboard can replace a mouse. The keys that substitute for it—the cursor movement keys, Home, End, and Enter—are all on or next to the keypad on the right side of the PC keyboard. The cursor keys repeat and



By default, *GEM Desktop* uses icons to represent files on your disk. Folder icons represent subdirectories, rectangles with bars are programs, and pages with folded corners are "others." Alternatively, you can request a simpler DIR-type listing of your files. Superimposed on the icon directory is the calculator included with *GEM Desktop*.



*GEM* applications, such as *GEM Paint* and *GEM Write*, have their own icons, but you can assign icons to non-*GEM* applications that you plan to run under *GEM Desktop*, choosing from the selection of icons provided by the program. This step isn't required, but it may help you keep track of your applications.



## ■ DOS ALTERNATIVES

rather coarsely move the pointer; holding down Ctrl gives the cursor keys finer control. GEM is really made for use with a pointing device, however; spend a minute with a mouse, and you'll wonder how you ever thought the cursor movement keys were adequate.

GEM Desktop is acceptably fast, although it could be smarter about disk accesses and screen updates when you're jumping back and forth between its many applications. *Windows*, *Top View*, and *DESQview* all help you switch between programs; GEM Desktop mildly discourages it.

GEM Desktop isn't meant for power users; it doesn't offer any features that COMMAND.COM lacks. Specifically (and unlike programs such as *Windows*), GEM won't let you run different programs in separate windows on the screen—not concurrently, not even one at a time. But then again not everyone is a power user and not all spreadsheet or database users know a lot about using DOS. Many PC users are comfortable enough in their easy-to-use applications but confused about going back and forth between them. For these users, GEM is a useful tool.

—Paul S. R. Chisholm

Paul S. R. Chisholm is a software developer for AT&T.



## FACT FILE



**GEM Desktop**  
Digital Research Inc.  
60 Garden Ct.  
Monte Vista, CA 93942  
(408) 649-3896  
List Price: \$49.95 (GEM  
Draw, \$24.95)  
Requires: 256K RAM,

two floppy drives (hard disk recommended), MS-DOS 2.0 or later or PC-DOS 3.0 or later, IBM Color/Graphics Adapter or Hercules Graphics Card or compatible. Mouse recommended.

**In Short:** An alternative operating environment that does not support multitasking or concurrent operation but does provide novices with an easy-to-use interface for their applications programs.

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# Announcing a radical new idea in PC-AT programming: **FREEDOM**

**Alslys Ada Compiler for the 80286 Defeats the Tyranny of 640K DOS;  
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The 80286 is a powerful chip. It can directly address up to 16 megabytes of memory. But unfortunately, you can't. DOS won't let you. And the compilers for whatever language you are currently using won't let you.

Until now.

Alslys has developed a new Ada compiler for the IBM PC-AT. Ada, of course, is the language mandated by the DoD for critical applications. Many believe it will be the dominant language for the rest of the eighties and nineties.

But leave aside Ada's virtues as a highly maintainable, portable, readable, software engineered language. Leave aside its acceptance and sponsorship by DoD, NASA, NATO, the FAA and large numbers of commercial users. Forget (if you can) the \$12 billion forecast in just DoD Ada sales through 1989.

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Think of the programs you could write if you could address 16 megabytes!!

It's like moving your AT from primitive to professional, roller skates to Rolls Royce. It lets you and your AT do everything you were meant to do.

The new Alslys Ada compiler, 300,000 lines of Ada code and self-compiled (with only 3 megabytes of memory!), also provides complete memory protection. An incorrect program affects no areas of memory except those allocated to the program. In particular, the operating system cannot be destroyed. And it does this, under control of DOS, *without any changes to DOS of any kind!*

No more Alt-Ctrl-Del restarts after a bug damages DOS!

Alslys is the premier Ada company in the world. France, U.S., U.K. And is about to become the premier AT compiler company in the world, too. For any language. For serious programmers frustrated by DOS.

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# COMPUTING OPTIONS FOR POWER USERS



*Competitors' responses to the IBM PC AT just keep rolling off the assembly line. This latest batch of AT alternatives, from a host of well-known makers, is a real winner.*





**T**he first batch of AT-compatible computers rolled off the assembly lines nearly a year after IBM announced its power machine. Under the assumption that our readers were as interested as we were in exploring these computers, we subjected them to the full battery of PC Magazine Labs benchmark tests and reported the results to you in "High-Performance Alternatives to the AT" (*PC Magazine*, Volume 4 Number 23).

No sooner had we sent these reviews to press than a few more candidates appeared on our doorstep, and then a few more—until we felt compelled to repeat our benchmark tests.

The results of those tests, as you'll read in the pages that follow, are overwhelm-

ingly positive. Well-known companies like Hewlett-Packard, Sperry, AT&T, and Texas Instruments have designed heavy-duty machines that not only equal the AT's power and capabilities but exceed them. Some of these computers carry higher price tags than the AT but offer more standard features. And a new player in the PC marketplace, PC's Limited, has introduced an AT that outperforms IBM's at a truly affordable price.

Not every AT alternative reviewed in this issue is an AT-compatible. Many PC and XT users want to speed up their operations, but because they don't need the huge power boost of an AT they don't want to pay the price. Computers like Zenith's Z-158 use an 8088 chip with an 8-megahertz clock speed to achieve better benchmark times than an XT, and a 15- or 20-mega-

byte hard disk to give you extra storage space.

Our reviewers (contributing editors Frank Derfler, Winn Rosch, and Jared Taylor and frequent contributor Jon Pepper) found the AT alternative machines a rewarding bunch. Choose the right one and it will reward you with increased productivity.

Computer manufacturers continue to work at copying or improving on the AT, so watch for reviews of more AT alternatives in upcoming issues of *PC Magazine*.—**Lisa Kleinman**

## High-Performance Computers: Summary of Features

Product	Price	Micro-processor	Clock speed (MHz)	Ports	Expansion slots
AT&T 6300 PLUS	\$5,095	80286	6	1 serial 1 parallel	4 8-bit 3 16-bit
Basic Time BT AT	\$4,495	80286	6	2 serial 1 parallel	2 8-bit 6 16-bit
Hewlett-Packard Vectra	\$3,199	80286	8	Optional	2 8-bit 5 16-bit
PC's Limited AT	\$1,995	80286	8	2 serial 1 parallel	8 16-bit 2 8-bit
Sperry PC-IT Personal Computer	\$4,340	80286	8	2 serial	9 8-bit only 5 8-bit or 16-bit
Texas Instruments Business Pro	\$3,995	80286	6	1 serial 1 parallel	1 8-bit short 5 16-bit long 2 8-bit long 6 16-bit short
Victor Technologies VPC	\$1,995	8088	4.77	1 parallel	1 8-bit short 6 16-bit long
Zenith Data Systems Z-158	\$2,499	8088-2	8 or 4.77	1 serial 1 parallel	5 IBM PC 1 Zenith

## PC MAGAZINE EDITOR'S CHOICE

Among this superior crop of AT-compatibles, two stand out. The AT&T 6300 PLUS and the Texas Instruments Business Pro combine all the features a power user could want: good looks, high-quality components, room for expansion, compatibility, and speed, plus the support of large, well-established companies. Both performed well on the PC Magazine Labs benchmark tests and elicited enthusiasm from our reviewers.

If you need TI compatibility or a multiuser XENIX machine, choose the TI Business Pro. But these considerations aside, which of these two winners you choose is a matter of aesthetics. The AT&T 6300 PLUS is a compact and well-designed machine; the TI Business Pro is also an attractive computer, but it has a heavy-duty, industrial look.

If price is your primary consideration, skip both AT&T and TI and choose this issue's best buy, the PC's Limited AT. Check its benchmark results—you won't be sacrificing performance to save money.

# AT&T 6300 PLUS

*Good design and ergonomics, speed, and a reasonable price make the 6300 PLUS an attractive choice.*

**D**eciding between the AT&T 6300 PLUS and the IBM PC AT is an easy task—there's no contest. The AT&T is flat out a better machine. You may have managed to overlook AT&T in the past (no small task, considering the size and persistence of the communications behemoth), but it's going to get a lot tougher to ignore it now. With the 6300 PLUS, AT&T is serving notice that it is a force to be reckoned with in the microcomputer market.

The stylish good looks and design of the 6300 PLUS call to mind some of the best European ergonomics. That's no accident—the machine is manufactured in Europe by Olivetti to design specifications created by Bell Labs. AT&T has managed to pack considerable AT power into a machine with a footprint smaller than that of many PCs. In fact, the 6300 PLUS seems virtually identical to its close cousin, the 6300 (see "High-Performance Alternatives to the PC AT," *PC Magazine*, Volume 4 Number 23), with a small, sleek



Above: The AT&T 6300 PLUS combines thoughtful design with AT power. The high-resolution monochrome monitor tilts and swivels. The keyboard has raised dots on the F, J, and 5 keys to help out touch-typists.

Right: One of the seven AT&T 6300 PLUS expansion slots is used by the hard disk controller. Three of the remaining six slots have the extended 16-bit connector.



system box, an excellent, high-resolution, tilt-and-swivel display, and a very comfortable keyboard.

The green monochrome monitor on the review machine offered excellent resolution and character definition that was easier on the eyes than any of the other machines I tested. The display did have just the slightest hint of a flicker.

The keyboard isn't plug compatible

with that of the AT, but you may not need it to be—it is far superior to the AT keyboard. The layout is somewhat nonstandard; it has an embedded cursor pad, the function keys are arranged along the top of the unit, and the Alt and Ctrl keys are to the



## FACT FILE

AT&T 6300 PLUS  
AT&T Information Systems  
1 Speedwell Ave.  
Morristown, NJ 07960  
(201) 898-2000

List Price: With 512K RAM, 1.2-megabyte and 360K floppy disk drives, keyboard, and monochrome monitor, \$5,095

Options: 20-megabyte hard disk drive, 512K RAM chip set, UNIX OX/MERGE, 80287 math coprocessor  
Microprocessor: 80286  
Clock Speed: 6 MHz  
Expansion Slots: 7

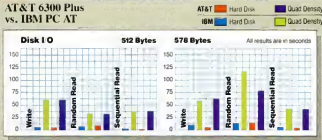
In Short: This well-designed 80286 machine ace our speed benchmarks and proved fully AT compatible.

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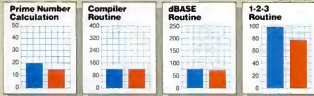


## BENCHMARK

### AT&T 6300 Plus vs. IBM PC AT



The disk I/O test measures the time it takes to create a 200K-byte data file using record lengths of 512 bytes and 578 bytes and then perform a random read of 256 records from the created file, followed by a sequential read of the same records. The test compares the AT&T 6300 PLUS's hard and quad-density floppy disk drives with the IBM PC AT's.



The prime number calculation test measures the speed at which the computer can find all the prime numbers between 1 and 50.

The compiler or program development test measures the speed of a two-step, self-driving DOS batch file using the IBM Personal Computer Linker program. Stage 1 takes a 341-line assembly code file (ASM), converts it to binary code, and links it with other binary files to make

an executable (.EXE) file. Stage 2 compiles and links source code to resolve address references and make an executable file. This test assesses the integration of the system as a whole, concentrating on interaction between the hard disk, microprocessor, and RAM.

The database applications test assesses hard disk processor interaction by performing a series of disk-intensive dBASE II, Version

2.41 tasks. The self-driving DOS batch file runs a total of six dBASE routines on 10 internal database records consisting of 154 bytes each, sorting on a database file (.DBF), indexing on 2 of the 13 data fields in each record, copying to a temporary database file, setting two indexes on a database file and appending a record, and deleting a record and packing (physical removal of deleted records) the database file.

Designed for a 540K environment, this spreadsheet applications test assesses the computational speed and RAM management capabilities of the machine by using a 1-2-3 macro that performs a series of both global and individual worksheet tasks. The macro copies and recalculates a 10-cell range 499 times, moves 100 cells, deletes 100 cells, and then systematically clears the spreadsheet.

**The 6300 PLUS performed better than or equal to the IBM AT on just about all of the PC Magazine Labs tests, losing only in the hard disk random read benchmark.**

left, below the Shift key.

The keys seem to be a bit smaller than on most keyboards, but their size wasn't a problem in use. Although the Return key wasn't the "giant-sized" model now in vogue on many machines, that's a minor gripe on a keyboard that has a lot going for it—like raised dots on the F, J, and 5 keys to help touch-typists orient themselves. Two different keyboards are available—the 6300 model (a PC model with the familiar ten function keys on the left) and the PLUS (or AT-compatible) model.

The clean lines of the system unit house

a standard 512K bytes of RAM, a parallel and a serial port, and room for two half-height devices, either two floppies (360K bytes or 1.2 megabytes) or a hard disk and a floppy. An optional expansion box will house two additional half-height devices. One of the 6300 PLUS's seven expansion slots is used by the hard disk controller (an 8-bit slot), leaving six available, of which three have the extended 16-bit connector. A hardware reset button is mounted on the front of the machine.

Currently, the only hard disk available for the 6300 PLUS is a 20-megabyte mod-

el manufactured by Seagate. Although it rated slow on the Core International benchmark, this result is somewhat misleading. The Core test measures only disk access speed; AT&T has enhanced the machine to speed up other disk functions. For example, while the 44-megabyte Sperry disk literally screams along, the AT&T matched or beat it on measures other than pure access time. And the technology in the AT&T drive is reliable—a factor to be considered when you read the seductive specs on some other machines.

While it just beat the AT and matched the Vectra on the prime number calculation, the 6300 PLUS simply ripped up the competition on the compiler benchmark and the dBASE sort routine (see PC Magazine Labs benchmarks results). The overall Norton SysInfo index was a very respectable 7.2. With performance like this, what more could you want? Just one thing: more internal mass storage, which is apparently on the way according to an AT&T spokesperson.

Compatibility didn't present any problems. The 6300 PLUS handled all the PC software available in the lab quite nicely, as might be expected. And with AT&T's well-designed documentation, even a fairly unsophisticated user should be up and running applications (at high speed) with little problem.

**BEAUTY, BRAINS, AND VALUE** The 6300 PLUS is a fine machine. It is quick, has a tiny footprint, a high-resolution display, and well-thought-out ergonomics. And this attractive machine is a reasonably priced AT alternative—the model CPU 22 (with the 20-megabyte hard disk drive, 1.2-megabyte floppy, and 512K bytes of RAM) comes to just over \$6,300—including the monitor and keyboard.

Another factor to consider is the strength and obvious longevity of AT&T: Service and continued support shouldn't be a problem. The 6300 PLUS's excellent value is further enhanced by its support for UNIX, no surprise considering its heritage. Performance and the AT&T name make the 6300 PLUS a wise choice for corporate buyers. ■

*Jon Pepper is a frequent contributor to PC Magazine.*

# HEWLETT-PACKARD VECTRA

*Hewlett-Packard's first IBM-compatible computer, the Vectra, offers AT functionality with some HP touches.*

**H**ewlett-Packard has, until recently, tried to buck the IBM trend. Its micros were designed to hook into HP's larger machines, which were already well established in the scientific and engineering markets. Although HP's efforts often featured interesting technology, they weren't PC compatible.

HP's strategy has obviously changed. Its latest effort is the Vectra, which offers PC AT compatibility as well as some Hewlett-Packard-only features.

Like many AT-compatibles, the Vectra can be configured in so many different ways that they are hardly worth listing. The main limitation on how powerful a machine you create will probably be your budget—the Vectra's many features are not cheap, and a typical configuration



Above: The Vectra's tilt-and-swivel display has an inner bezel that tilts.

Right: The Vectra's motherboard will take 640K bytes of RAM, but with additional memory cards, you can cram in up to 3.64 megabytes.



could easily run you over \$7,000. The review machine featured 360K-byte and 1.2-megabyte floppy drives along with a 20-megabyte hard drive.

**INSIDE OUT** Opening up the relatively small system box (about 30 percent smaller than that of the AT) reveals engineering that befits the HP name tag: Everything is well laid out, neatly routed, and very sturdy-looking.

Seven expansion slots are available—two 8-bit and five 16-bit, but the disk controller will use up one of the 16-bit slots and you will need to install a



## FACT FILE

### Vectra

Hewlett-Packard Co.

3000 Hanover St.

Palo Alto, CA 94304

(800) FOR-HPCC

List Price: 256K RAM, one 360K floppy

disk drive, \$3,199

Options: 20 or 40 megabyte hard drive, monochrome or color monitor, mouse, graphics tablet, bar code reader, floor stand, communication interfaces, 1200 baud modem, external disk tape mass storage system, IRMA board

Microprocessor: 80286

Clock speed: 8 MHz

Expansion Slots: 7

In Short: A high-priced, solidly engineered AT compatible that can be configured to match your needs.

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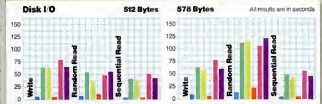




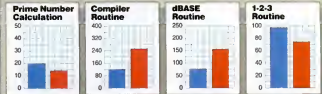
## BENCHMARK

HP Vectra vs.  
IBM PC AT

HP Hard Disk Double Density Quad Density  
IBM Hard Disk Double Density Quad Density



The disk I/O test measures the time it takes to create a 200K-byte data file using record lengths of 512 bytes and 576 bytes and then perform a random read of 256 records from the created file, followed by a sequential read of the same records. The test compares the Vectra's hard, double-density floppy, and quad-density floppy drives with the IBM PC AT's.



The prime number calculation test measures the speed at which the computer can find all the prime numbers between 1 and 50.

The compiler or program development test measures the speed of a two-step, self-tuning DOS batch file using the IBM Personal Computer Linker program. Stage 1 takes a 341-line assembly code file (ASM), converts it to binary code and links it with other binary files to make

an executable (.EXE) file. Stage 2 compiles and links source code to resolve address references and make an executable file. This test assesses the integration of the system as a whole, concentrating on disk interaction between the hard disk, microprocessor, and RAM.

This database applications test assesses hard disk processor interaction by performing a series of disk-intensive dBASE II, Version

2.01, tasks. The self-tuning DOS batch file runs a total of six dBASE routines on 81 individual database records consisting of 164 bytes each, sorting on a database file (DBF), moving on 2 of the 13 data fields in each record, copying to a temporary database file, setting two indexes on a database file and appending a record, and deleting a record and packing (physical removal of deleted records) the data base file.

Designed for a 640K environment, this spreadsheet application test assesses the computational speed and RAM management capabilities of the machine by using a 5.5 x 3 macro that performs a series of both global and individual worksheet tasks. The macro copies and recalculates a 10-cell range 496 times, moves 1,000 cells, deletes 1,000 cells, and then systematically clears the spreadsheet.

The Vectra shows real calculation speed; its weakness is in disk-intensive tasks. But note how Vectra made up for its slow I/O on the 1-2-3 routine with fast calc.

video card in another. The Vectra uses an 8-MHz 80286 chip and has a socket on the motherboard for a 80287 coprocessor. The motherboard will take 640K bytes of RAM, and additional memory cards can push that total to 3.64 megabytes.

The Vectra can accommodate three internal drives, which you can easily slide into place. Both double-density and high-density floppy drives are available, as are a 20-megabyte hard drive and a 60-megabyte, 1/4-inch tape backup system. For those who already have HP systems in place or need to exchange data with them,

a 3 1/2-inch external drive is also available. All internal drives are half-height. The front of the system box also features a push-button on/off switch and an optional security keylock; a front-mounted hardware reset button is one of the few things the Vectra lacks.

**RIGHT ON KEY** The Vectra's human interface—the keyboard and monitor—is first-rate. The keyboard is the same ubiquitous off-white as the rest of the unit; it has contrasting crimson lettering, and its sleek design includes a height adjustment

option. Its layout is a cross between the PC and the AT with some unique Hewlett-Packard features thrown in. For example, LED indicators for CapsLock, NumLock, and ScrollLock are located on the upper-right side of the keyboard. The function keys are in their usual place, but eight additional function keys march along the top of the keyboard. These extra keys are used with PAM (Personal Applications Manager), an HP DOS shell. Overall, the keyboard is exemplary, with a separate cursor pad and a nice feel.

The Vectra has a tilt-and-swivel display with an interesting variation: It is the inner bezel surrounding the tube that actually tilts. The review machine featured a 12-inch color monitor, although the Vectra offers the same resolution—640 by 400 pixels—on a monochrome monitor as well. The monitor, a combination of analog and RGB composite video, is driven by HP's multimode video adapter. This card allows both IBM-compatible resolution (640 by 200 and 320 by 200) and HP's higher resolution for both text and graphics. The HP Touchscreen is an option.

The Vectra is both high-powered and highly IBM compatible. On CPU-intensive applications, the Vectra scored well. If you're used to PC performance, the Vectra will doubtless impress: the Norton Synsfio test ranks its processing speed at 7.7 times that of the standard PC (the plain-vanilla AT clocks in at 5.9). However, for disk-intensive operations, the Core International hard disk test informed me that the Vectra had "one of the slowest hard drives" available.

The Vectra is undoubtedly a very capable AT alternative. You can network it to almost anything, add tons of options, and probably count on solid support from HP and few (if any) compatibility problems with PC or PC AT software. However, little software is currently available to take advantage of the monitor's potential; when it will be available is anyone's guess. If you're an HP fan or need to link up to HP equipment, the Vectra won't disappoint you. If you're a power user, you'll probably be happy with the machine's capabilities, despite its relatively slow hard disk access times. But don't forget that solid construction and the Hewlett-Packard name don't come at a bargain price. ■

# TEXAS INSTRUMENTS BUSINESS PRO

*A real industrial strength muscle machine, the AT-compatible TI Business Pro has room for six internal drives and 14 expansion boards.*

The Texas Instruments Business Pro is constructed like a piece of industrial hardware, and it's ready to take on any challenge you give it. It offers everything you'd want in an AT compatible, as well as some extra TI goodies.

The Business Pro's cabinet is slightly taller than the IBM PC AT and not as wide. The finish on the outside of the heavy-gauge sheet metal is a separate piece of synthetic material instead of just thick paint. Reinforcing rods hold the chassis together. Handling the TI Business Pro is a job for somebody with muscles; this machine is solidly built and it packs a lot of power into a reasonably sized frame.



## FACT FILE

### Texas Instruments Business Pro

Texas Instruments Inc.  
Data Systems Group  
P.O. Box 2909  
Mail Station 2234  
Dallas, TX 78769-2909  
(800) 232-3200

**List Price:** 512K RAM, one serial port, one parallel port, 1.2-megabyte floppy disk drive, \$3,995; for 512K RAM, serial port, parallel port, 1.2-megabyte floppy disk drive, 20-megabyte hard disk drive, \$5,795  
**Options:** 60-megabyte tape backup, 30-megabyte hard disk drive, 360K floppy disk drive, TI-mode color video card, IBM PC-mode color video card, color monitor, monochrome monitor

**Microprocessor:** 80286

**Clock Speed:** 6 MHz

**Expansion Slots:** 14

**In Short:** A sturdy and powerful AT-compatible that can operate in either a Texas Instruments or an IBM mode.

CIRCLE 884 ON READER SERVICE CARD



Above: The Texas Instruments Business Pro's gray-brown appearance is a change from the cream-colored look of IBM machines.

Right: The Business Pro's motherboard holds one serial port and one parallel port, plus 640K bytes of RAM and an 80286 processor speeding along at 6 MHz with no wait states.



**STILL GROWING** The Business Pro is burly, giving you space for as many additions as you could possibly need. It has room for six internal storage devices—hard disks, floppies, and tape backup mechanisms in various combinations. In case you need more muscle than the standard system offers, the Business Pro has 14 (yup, 14!) expansion slots. Eleven (5 short and 6 long) are compatible with the IBM PC AT

bus and 3 (1 short and 2 long) have the standard PC bus. After you add a video card and a disk controller card, a dozen vacant slots are still open for expansion.

The motherboard holds one serial port and one parallel port along with 640K

bytes of RAM. A dedicated memory expansion slot on the motherboard allows you to put up to 3 megabytes of 16-bit-wide RAM into the system. The Business Pro uses 150-nanosecond 256K-bit chips. The heart of this machine is an 80286 processor beating at 6 MHz with no wait states, so that it can take advantage of this fast memory. A 230-watt power supply keeps everything running.

Despite its heavy construction, it is easy to get inside the Business Pro to install cards. But, interestingly enough, the lock on the front of the computer not only controls the electrical connection to the hard disk, it really locks the cabinet into place. You can't defeat the electrical protection just by removing the cabinet as you can with most lockable AT clones.

The basic Business Pro system, which includes 512K bytes of RAM, a high-density floppy drive, a parallel port, and a serial port, carries a price tag of \$3,995.

**DUAL THREAT** TI's Business Pro can play the game any way you like it: hard and fast, soft and colorful, TI or IBM. That is, this smart machine can chew into your data operating as either a TI Professional on steroids or a bulked-up IBM PC AT. The video systems in standard TI and standard IBM products aren't compatible with each other, so TI gives you the option of having either video card installed—or both. If you have both the TI and IBM PC video cards inside, you let the computer know which card you want active by typing a MODE command from DOS (you can also put the command into an AUTOEXEC.BAT file). You can mix programs with TI and IBM video drivers on the hard disk.

Both modes work well, but that's not where the Business Pro's flexibility ends. It also has the processor power and expansion ports needed to be a useful multiuser computer under XENIX.

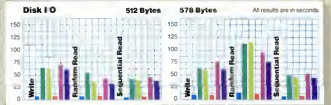
The physical machine is flexible as well. The TI Business Pro is designed either to sit as a pedestal-mounted unit on the floor or to function as a traditional desktop system. The monitor can tilt and swivel and has connections for the keyboard and a mouse. Since you can connect the keyboard to either the system unit or monitor, you can arrange the components of your system in several different ways. Color



## BENCHMARK

### T.I. Business Pro vs. IBM PC AT

TI Hard Disk Double Density Quad Density  
IBM Hard Disk Double Density Quad Density



The disk I/O test measures the time it takes to create a 200K-byte data file using record lengths of 512 bytes and 576 bytes and then perform a random read of 256 records from the created file, followed by a sequential read of the same records. The test compares the TI's hard, quad-density floppy and double-density floppy drives with the IBM PC AT's.

#### Prime Number Calculation



The prime number calculation test measures the speed at which the computer can find all the prime numbers between 1 and 50.

The compiler or program development test measures the speed of a two-step, self-testing DOS batch file using the IBM Personal Computer Linker program. Stage 1 takes a 34-line assembly code file (ASM), converts it to binary code and links it with other binary files to make

#### Compiler Routine



an executable (.EXE) file. Stage 2 compiles and links source code to resolve address references and make an executable file. This test assesses the integration of the system as a whole, concentrating on interaction between the hard disk, microprocessor, and RAM.

This database applications test assesses hard disk processor interaction by performing a series of disk-intensive dBASE II, Version

#### dBASE Routine



2.40 tasks. The self-testing DOS batch file runs a total of six dBASE routines on 81 individual database files, each consisting of 154 bytes each, sorting on a database file (DBF), indexing on 2 of the 13 data fields in each record, copying to a temporary database file, setting two indexes on a database file and appending a record, and deleting a record and packing (physical removal of deleted records) the database file.

#### 1-2-3 Routine



Designed for a 640K environment, this spreadsheet applications test assesses the computational speed and RAM management capabilities of the machine by using a 1-2-3 macro that performs a series of both global and individual worksheet tasks. The macro copies and recalculates a 10-cell range 499 times, moves 1,000 cells, deletes 1,000 cells, and then systematically clears the spreadsheet.

*Texas Instrument's Business Pro either runs neck-and-neck with the AT or nips the IBM standard by a hair on just about every task.*

and monochrome monitors are available.

**SMOOTH ENTRY** As for its appearance the Business Pro is tough, but not ugly. The best-looking part of this attractive machine is its keyboard. The keyboard is slightly concave and very smooth. The Return key is huge, and the full complement of PC AT keys are included, plus two extra function keys (F11 and F12), Line Feed, and Send keys. The additional function keys are used for TI programs and the other keys are important for communications and terminal emulation.

**THE ALL-AMERICAN MACHINE** The Texas Instruments Business Pro left the PC Magazine Labs for the art department with a note reading: "Photograph this machine like you would Johnny Rambo. He looks better with his shirt off." Like Rambo, the TI Business Pro is a macho and rugged machine with plenty of firepower.

Power users will have to look hard for ways to stress the capabilities of this computing iron.

*Frank J. Derfler, Jr., is a contributing editor of PC Magazine.*

# "I feel so expansive!"

Our tech specialist cried. "Or is it extended, expanded, or fried? All of these options are driving me crazy. I'd figure them out if I wasn't so lazy."

✓ denotes IBM-AT compatibility.

## SOFTWARE

We only carry the latest versions of products. Version numbers in our ads are current at press time.

### Alpha Software

✓Keyworks	\$49.
✓DataBase Manager II 2.02	169.
✓Electric Desk 1.1	195.

### Aptec

✓ColorScreenPrint 2.0	59.
✓Rainbow Writer Screen Grabber 1.1	69.
✓Rainbow Writer Color Text Formatter 2.1	119.

### Ashtron-Tate

✓dBase II 2.43	call
✓dBase III	call
✓Framework II	call

### Best Programs

PC Connection 15-day money back guarantee on these Best Programs.

✓PC/Tax Cut (1986 version for 1985 taxes)	124.
✓Personnel Series Level I	279.
✓Personnel Series Level II	419.
✓Personnel Series Level III	559.
✓Personal Finance Program 2.0	65.
✓Professional Finance Program 4.0	149.
✓PC/Fixed Asset System 3.0	329.

### Bible Research

✓THE WORD 3.0 (KJV Bible)	157.
✓THE WORD 3.0 (NIV Bible)	157.

### Borland International

✓Turbo Tutor 1.0	19.
✓Turbo Database Toolbox 1.1	30.
✓Turbo Graphix Toolbox 1.0	30.
✓Turbo Editor Toolbox 1.0	37.
✓Turbo Gamesworks 1.0	37.
✓Turbo Newpak (Gamesworks and Editor)	52.
✓Turbo Lightning 1.0 (w/spelling dictionary and thesaurus)	57.

✓Sidekick 1.5 (copy-protected)	30.
✓Sidekick 1.5 (non-protected)	48.
✓Rafix 1.0	57.
✓Superkey 1.1	37.
✓Superkey/Sidekick Package (includes \$15 rebate coupon from Borland)	67.

✓Turbo Pascal 3.0	37.
✓Turbo Pascal 3.0 w/BCD	37.
✓Turbo 8087 3.0	59.
✓Turbo 8087 3.0 w/BCD	72.
✓Turbo Holiday Pak (Pascal 3.0, Tutor, and Database Toolbox)	67.

## PC Connection Software Special through February 28, 1986

### MICROSOFT

#### Windows

Get the whole picture as you work back and forth between multiple applications, and pass information between standard DOS and Windows applications.

Includes:

- MS DOS Executive (DOS file manager and Microsoft Windows Write and Paint)
- Clock/calendar, alarm, notepad and calculator
- Clipboard (to view copied applications)
- RAM drive and print spooling control panel

For the IBM-PC, XT and AT ..... \$62.

✓Turbo Holiday Jumbo Pak (Pascal 3.0, Database, Editor & Graphics Toolboxes, Tutor and Gamesworks) ..... 139.

### BPI Accounting Software

✓General Ledger C.13	289.
✓Accounts Payable C.13	289.
✓Accounts Receivable C.13	289.
✓Business Builder (G/L, A/R, A/P, Payroll, information management, spreadsheet, business graphics and word processing)	399.

### Breakthrough

✓Timeline 2.0	249.
✓Broderbund	49.
✓Bark Street Writer	49.
✓Print Shop	35.
✓Graphics Library #1	22.

### Conceptual Instruments

✓The Desk Organizer 2.0	59.
✓Connecticut Software	37.
✓Sideline 5.0	37.
✓Printer Boss 5.0	99.

### Dac Software

✓Dac Easy Accounting	45.
✓Dac Easy Word	32.
✓Dac Easy Payroll	32.

### Decision Resources

✓Chart-Master 6.1	237.
✓Diagram-Master 5.0	207.
✓Sign-Master 5.1	157.

### Digital Research

✓GEM Desktop 1.2	\$30.
✓GEM Draw 1.2 (includes Desktop)	93.
✓GEM Collection 1.2 (includes Desktop, Paint and Write)	119.

### Dow Jones

✓Market Manager +	145.
✓Spreadsheet Link	145.
✓Membership Kit	19.

### Enertronics

✓Energraphics 1.3	165.
✓Evergreen	
✓Accounts Payable 1.01	133.
✓Accounts Receivable 1.01	133.
✓Payroll 1.01	133.
✓One Write Plus 1.0	169.

### Financial Software

✓Financier II 2.1	59.
✓Friendlysoft	
✓Friendly Writer 3.2 (w/Friendly Speller)	55.

### Funk Software

✓Sideways 3.0	37.
✓Graphic Communications	
✓Graphwriter Combo Set	305.
✓Freelance	189.

### Harvard Associates

✓PC LOGO 2.0	99.
✓Harvard Software	
✓Harvard Project Manager 1.16	209.
✓Harvard Total Project Manager 1.0	289.

### Human Edge

✓Mind Prober	27.
✓Infocom	
✓Cornerstone 1.0	279.

### Listrac

✓Volkswriter 3	159.
✓Volkswriter Scientific 1.0	289.

### Living Videotext

✓ThinkTank 2.0	109.
✓Ready 1.0	49.

### Micro Education (MECA)

✓Jim Fixx Running Program 1.2	49.
✓Managing Your Money 2.0	99.

### Micropro

✓Easy 1.0	97.
✓WordStar 3.31	179.
✓WordStar Propak 3.31	259.

Hard disk recommended for Wordstar 2000 & Wordstar 2000 Plus

✓WordStar 2000 1.01	259.
✓WordStar 2000 Plus 1.01	299.

### Microrim

✓Extended Report Writer 1.2	85.
✓Clout 2.0	135.
✓R-base 5000 1.01	369.

✓Upgrade Kit to R-base 5000	129.
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For the IBM-PC Exclusively.

# PC CONNECTION®

# "It works with one finger!"

Said our proud copywriter. "It makes my job easier, faster, and brighter." But she quickly admitted, when I pressed her some more, that printing it out was really a chore.

<b>Microsoft</b>	
Multiplan 2.0	\$119.
Microsoft Word 2.01 (w/Ready)	247.
Microsoft Project 2.0	call
Microsoft Chart 2.0	197.
Windows 1.0	special

The following Microsoft mice now come with PC Paintbrush 3.0 software:

Microsoft Bus Mouse with software 5.0	135.
Microsoft Serial Mouse with software 5.0	135.

## LANGUAGES

Quick Basic 1.0	69.
Pascal Compiler 3.31	175.
Macro Assembler 4.0	105.
Fortran Compiler 3.31	205.
Basic Interpreter 5.28	205.
Basic Compiler 5.36	235.
C Compiler 3.0	235.
Business Basic Compiler 1.10	258.

## Microsoft

InfoScope 1.03	45.
Crosstalk XVI 3.6	95.
Remote 1.3	95.
Transporter 1.4 (includes Crosstalk)	169.

## Multimate International

Just Write 1.0	79.
Multimate 3.31	call
Multimate Advantage 3.6	call

## Nantucket Software

Clipper	349.
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## Peter Norton

Norton Utilities 3.1	59.
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## Powerbase Systems

Powerbase 2.1	197.
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## Quarterdeck

DesqVIEW 1.0	65.
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## Rosssoft

Prokey 4.0	89.
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## Satellite Software

WordPerfect 4.1	239.
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## Scarborough Systems

Your Personal Net Worth 1.1	59.
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## Simon & Schuster

Webster's New World Speller 1.2	39.
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## Softstyle

Printworks 1.05	39.
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## Software Digest

### Ratings Newsletter

This publication is unparalleled for its comprehensive, reliable evaluations. 1985's issues evaluate the following programs: word processors, file mgmt., database mgmt., spreadsheets, graphics, integrated accounting, project mgmt., communications, integrated productivity.

Single copy..... 24.50.

Year subscription..... 245.00.

## Software Group

Enable 1.1	call
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## Software Publishing

PFS:Proof B.00	59.
PFS:Report B.01	77.
PFS:Access A.00	84.
PFS:File B.01	84.
PFS:Graph B.01	84.
PFS:Plan A.01	84.
PFS:Write C.00 (w/PFS:Proof)	84.
First Success (Combo Pack includes PFS: Write, Proof, Plan, File)	229.

## Sorcin/US

SuperCalc 3 2.1 (w/Sideways)	199.
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## Spectrum Holobyte

Art Studio	32.
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Executive Picture Show	139.
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## Springboard

Newsroom	35.
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Clip Art Volume 1 (for Newsroom)	19.
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## Union

Art Gallery 1	22.
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Printmaster 1.1	37.
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## United Software

Ernst & Young 7.2 (w/coupon for free Speller)	99.
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In-House Accountant 2.05	109.
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ASCI Pro 4.23	69.
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## Xanaro

Ability 1.0A	call
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## TRAINING

### ATI

#### SKILL BUILDER PROGRAMS

Intro and How To Use:	
Word Processing	MS-DOS
Business Software	PC-DOS
Data Bases	Training Tutor
Compaq	BASIC
IBM-PC	each 38.

#### TRAINING POWER PROGRAMS

How to Use:	
dBase II	dBaseIII Lotus 1-2-3
MS Word	Supercalc 3 Multimate

# 1-800/243-8088

PC Connection  
6 Mill St., Marlow, NH 03456  
603/446-3383

215M

Multiplan	Wordstar	Framework
Wordperfect	Symphony	Displaywrite 3
		each \$49.

## Friendlysoft

PC Intro Set	35.
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## INDIVIDUAL SOFTWARE

The Instructor II	35.
Professor DOS	47.
Tutorial Set (both items above)	47.
Professor Pixel	47.
Typing Instructor	39.
Training for Lotus 1-2-3	49.
Training for dBase III	49.
Training for Project Management	49.
Scarborough Systems	
MasterType	26.
Simon & Schuster	
Typing Tutor III	33.

## EDUCATIONAL

### Barron's

Computer SAT	59.
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### Designware

Spellcopter (ages 6 to adult)	25.
Mission Algebra (ages 13 to adult)	27.
European Nations (ages 9 to adult)	27.
Grammar Examiner (ages 9 to adult)	27.
States and Traits (ages 9 to adult)	27.

### Digital Research

Diagnostic Test (PSAT)	14.
OwlCat SAT (15 hours)	63.
OwlCat SAT (60 hours)	169.

### Eduware

Algebra 1	22.
Algebra 2	22.
Algebra 3	22.

### Harcourt Brace Jovanovich

Computer SAT	49.
Computer GRE	57.

### Scarborough Systems

Build-a-Book (ages 2 to 12)	19.
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### Simon & Schuster

Lovely's SAT	39.
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### Spinnaker

All Spinnaker products now work with DOS 2.x and 3.x.	
Educational Games for Young Computer Users. (All require graphics board)	
Face Maker (ages 3 to 8)	18.
Kids on Keys (ages 3 to 9)	18.
Fraction Fever (ages 7 to adult)	18.
Kinder Comp (ages 3 to 8)	18.
Alphabet Zoo (ages 3 to 8)	20.
Kidwriter (ages 6 to 10)	20.
Trains (ages 3 to 8)	20.
Snooper Troops I (ages 10 to adult)	23.

For the IBM-PC Exclusively.

# PC CONNECTION®

# "Look at these numbers!"

Our accountant exclaimed. "It breaks them all down, it makes it all plain." But when I asked him to move a digit or two, he explained with a sigh it was too hard to do.

## Spinnaker (continued)

• Snooper Troops II (ages 10 to adult) ...	\$23.
• In Search of the Most Amazing Thing (ages 10 to adult) ...	23.
• Delta Drawing (ages 4 to adult) ...	27.
• President's Choice (ages 4 to adult) ...	27.

## Springboard

• Fraction Factory (ages 8 to 14) ...	19.
• Make A Match Math (ages 2½ to 6) ...	19.
• Piece of Cake Math (ages 7 to 13) ...	22.
• Early Games for Young Children (ages 2½ to 6) ...	22.
• Music Maestro (ages 4 to 10) ...	22.
• Easy As ABC (ages 3 to 6) ...	24.

## Stone (requires graphics board)

• Across the U.S.A. (ages 5 and up) ...	22.
• My Letters, Numbers, Words (ages 1 to 5) ...	29.
• Kids Stuff (ages 3 to 8) ...	29.
• Memory Master (ages 3 to 8) ...	29.

## The Learning Company

• Addition Magician (ages 6 to 10) ...	23.
• Magic Spells (ages 6 to 10) ...	23.
• Word Spinner (ages 6 to 10) ...	23.
• Reader Rabbit (ages 5 to 7) ...	26.
• Mopdown Hotel (ages 8 to 13) ...	26.
• Number Stumper (ages 6 to 10) ...	26.
• Mopdown Parade (ages 8 to 12) ...	26.
• Rocky's Boots (ages 9 and up) ...	32.

## RECREATIONAL

• Blue Chip High finance simulations.	32.
• Baron	32.
• Millionaire	32.
• Squire	32.
• Tycoon	32.

## Broderbund

• Championship Lode Runner	23.
• Ancient Art of War	27.

## CBS

• Murder By The Dozen (your turn, Sherlock)	21.
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## Electronic Arts

• Pinball Construction Set	25.
• Dr. J/Larry Bird One-on-One	28.
• Music Construction Set	28.

## Friendlysoft

• PC Arcade	35.
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## Funtastic

• Among the finest arcade style games available.	
• Cosmic Crusader	27.
• Sneak Attack II	27.
• Big Top	29.
• Master Miner	29.

## Hayden Software

• Sargon III (highest rated Chess program)	35.
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## Infocom Difficulty levels shown in italics

JUNIOR	
• Seastalker	\$25.

## STANDARD

• Enchanter	the Witness	Planetfall
• Cutthroat	Wishbringer	Zork I
• Hitchhiker's Guide		each 25.

## ADVANCED

• Zork II	Zork III	Infidel
• Sorcerer	Suspect	
• A Mind Forever Voyaging		each 29.

## EXPERT

• Deadline	Starcross	Suspended
• Spellbreaker		each 31.

Invisicures (hint booklets) are available for most Infocom games. Specify game... 6.

## Microleague Sports

• Microleague Baseball (you are the manager)	25.
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## Microprose

• F-15 Strike Eagle	22.
• Hercules Mono Card	32.

## Microsoft

• Flight Simulator 2.12 (now works with Invisicures (hint booklets) are available for most Infocom games. Specify game... 6.	
• Six scenery (airport) disks are available for Flight Simulator (also work on Sublogic Jet)	each 15.

## 1Step Software

• Golf's Best (Pinhurst or St. Andrew's)	32.
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## Origin Systems

• Ultima III	39.
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## Parlor Software

• Bridge Parlor (the best Bridge simulation)	49.
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## PCSoftware

• Championship Blackjack	23.
• Chess 2001	27.

## SEGA

• Spy Hunter	29.
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## Sierra On-Line

• Championship Boxing	24.
• Black Cauldron	25.

## King's Quest

• King's Quest II	33.
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## Si-Tech

• Wizardry	42.
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## Spectrum Holobyte

• GATO	27.
• Teletar (w/Halley's Comet)	32.

## Sublogic

• Night Mission Pinball	29.
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• Jet	\$33.
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• Six scenery (airport) disks are available for Jet (also work on Microsoft Flight Simulator) each: 15.

## Telerium

• Rendezvous with Rama	27.
• Amazon	27.

## XOR

• Fahrenheit 451	27.
• NFL Challenge (be the coach)	79.

## HARDWARE

### AST Research

All AST Boards come with a full one year warranty.

• SixPakPlus 64k upgradeable to 384k, with clock calendar, serial & parallel ports & now includes Sidekick version 1.5 non-copy protected (game port optional) ... 225.

• 384k (fully populated) ... 249.

• MegaPlus II 64k upgradeable to 256k (or more with MegaPak) with clock calendar and serial port (parallel, game, or second serial port optional) ... 249.

• IQ Plus II with clock calendar and serial port (parallel, game, or second serial port optional) ... 125.

• Parallel, game, or second serial port for any AST board (specify board) ... 35.

• AST-5251-11 ... 579.

• AST-3780 ... 579.

• Reach Modem half card 300/1200 baud internal modem includes Crosstalk XVI ... 349.

• Advantage 128k upgradeable to 1.5 Meg (or more with Piggyback Card), with serial, parallel ports, now includes Sidekick version 1.5 non-copy protected (game port and second serial port optional) ... 379.

• RAMpage! upgradeable to 2Mb, fully supports LOTUS/INTEL expanded memory specification (EMS) ... call

### Amdak

• Video 300G composite monitor (green) ... 129.

• Video 300A composite monitor (amber) ... 139.

• Video 310A mono monitor (amber) ... 169.

• Color 600 - RGB monitor ... 399.

• Color 710 - RGB monitor ... 449.

### Compucable

• Plastic Keyboard & Drive Cover Set ... 17.

• IBM Mono Screen Enhancement ... 17.

• IBM Color Screen Enhancement ... 21.

### Cuesta

• Uninterruptable power backup units

• Datasaver 240 WATT ... call

• Datasaver 400 WATT ... call

For the IBM-PC Exclusively.

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# "I'm not very impressed,"

I said to all three, "Your computer production seems micro to me. Why, I can do better with one simple call, and it will end all your problems once and for all."

## Curtis

### ACCESSORIES

PC Pedestal (for IBM Mono or Color)	\$37.
Portable Pedestal	47.
System Stand	19.
System Stand for IBM-AT	37.
Low Profile Tilt and Swivel Pedestal	37.
Crystal 300-watt (line conditioner)	159.

### CABLES

AC Plug Adapter (any monitor to your PC)	8.
Smartmodem to IBM Cable	17.
Keyboard Extension Cable (3 to 9 feet)	27.
Extension Cables for IBM Mono Display	33.
Color and Monochrome Extension cables	39.
Printer-to-IBM cable	17.

### SURGE SUPPRESSORS

All surge suppressors have an on/off switch.	
Safestrip	21.
Diamond (6 outlets)	28.
Emerald (6 outlets; 6 ft cord)	34.
Sapphire (3 outlets; EMIRFI filtered)	44.
Ruby (6 outlets; EMIRFI filtered; 6 ft cord)	50.
Command Center (5 outlets; EMIRFI filtered; digital clock; master key switch; circuit breaker)	123.

## Epson

All Epson dot matrix printers have built in graphics capability. In addition, the LX-80, FX-85, FX-286 and LX-90 can all print in near letter quality (NLQ).

DX-10 (letter quality)	call
DX-20 (letter quality)	call
DX-35 (letter quality)	call
FX-85 (replaces FX-80+)	call
FX-286 (replaces FX-185)	call
HL-80 plotter	399.
LX-80	call
LX-90	call
LO-1500 (letter quality dot matrix)	call
SO-2000 Ink Jet	call
Epson Books	call
Printer-to-IBM cable	15.
We are an authorized Epson service center. Ask about the extended service plan.	

### FTG

Light Pen	195.
Demo Disk for Light Pen	39.

## Hayes

Smartmodem 300	149.
Smartmodem 1200	389.
Smartmodem 1200B (w/Smartcom II)	349.
Smartmodem 1200B (no software)	289.
Smartmodem 2400	579.

## PC Connection Hardware Special

through February 28, 1986

### ORCHID TECHNOLOGIES Conquest Multifunction Board 2k

A multifunction board that can hold as much as 2 Meg and supports Lotus/Intel Expanded Memory Specifications (EMS) as well as allowing you to backfill to expand your DOS accessible memory to 640k. Use as many as 4 Conquests for up to 8 Meg of total RAM or add optional PC Net daughterboard for LAN system.

#### Includes:

- clock/calendar
- serial and parallel ports
- software for disk cache, RAM drive and print spooler

For the IBM-PC and XT ..... \$264.

Smartmodem 2400B (w/Smartcom II)	539.
Smartcom II 2.1 (software)	89.
Transet 1000	289.
Accessory Kit for Transet 1000 (cable and software)	29.

### Hercules

Hercules Color Card (parallel port)	169.
Hercules Graphics Card (parallel port)	299.
Hercules Graph-X Software 2.0	42.

### Innovative Concepts

Flip n' File 50	16.
Flip n' File 50 w/lock	21.
Library Case (holds 10 disks)	4.
Intel	
Above Board PC	call
Above Board AT	call
Above Board PS (multifunction board)	call

# 1-800/243-8088

## PC Connection

215M

6 Mill St., Marlow, NH 03456  
603/446-3383

Piggyback board for AT	call
8087-3	129.
8087-2	139.
80287	225.

### Kenelington Microware

Masterpiece	94.
Masterpiece Plus	129.
Printer/portable computer stand	17.

### key tronic

5150 keyboard	139.
5151 keyboard (deluxe)	169.
5153 keyboard (with touch pad)	289.
AT Converter (allows Key tronic 5151 keyboard to work with the AT)	12.

### Kraft

Joystick	29.
Executive Cursor Control (w/Joystick)	47.
Executive Cursor Control (software only)	27.

### Mouse Systems

PC Mouse (w/software, pad, & PC Paint)	139.
--	------

### Orchid Technologies

All Orchid Boards come with PCnet Drive (Ram disk), PCnet spool (print spooling), disk caching & partitioning.

Conquest Multifunction Board 2k upgradeable to 2Mb, fully supports LOTUS/INTEL expanded memory specification (EMS), includes clock calendar, serial port, and parallel port. A PCnet Daughter Board can be added ..... special

PCnet Daughter Board piggybacks to Conquest with networking software ..... call

PC Net (stand alone card) ..... call

PC Turbo 186 w/256k and Turbo Daughter Board upgradeable to 640k, increase the speed of your PC ..... call

Eccell Multifunction Card for the AT 2k upgradeable to 1 Meg, fully supports LOTUS/INTEL expanded memory specification (EMS) and Error Correction Code (ECC). (serial and parallel ports optional) call

Paradise Systems

Color/Mono Card	149.
Modular Graphics Card	275.
Backpack for Modular Graphics Card (2k upgradeable to 384k)	225.
Multidisplay Card	195.
Five Pack w/384k	149.

### PC Designs

FD 1000 Computer ..... 789.  
PC Magazine called it "a top performance bargain" (Oct. 15). PC Week called it "a terrific machine at a terrific price" (May 10). Please call for more information about this computer.

For the IBM-PC Exclusively.

# PC CONNECTION

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# "800/243-8088," I commanded,

"When your PC isn't acting the way that you planned it. We buy from these people 'cause after the sale, their service and support simply won't fail."

## Princeton Graphics

•HX-12 RGB monitor (690 x 240) .....	\$449.
•HX-12E RGB monitor (EGA compatible) .....	589.
•MAX-12E Amber monochrome monitor .....	179.
•SR-12 RGB monitor (690 x 480) .....	597.
•ISM Scan II Board for SR-12 .....	149.

## Quadram

Expanded Quadboard with clock calendar, parallel, serial & game port, I/O bracket, and Quadmaster software.	
384k (fully populated) .....	239.
2k (upgradeable to 384k) .....	189.
Gold Quadboard 2k upgradeable to 640k, includes Quadmaster III software, clock calendar, serial port, parallel port, and IBM compatible color graphics (second serial or parallel port optional) .....	367.
Silver Quadboard 2k upgradeable to 640k, includes Quadmaster III software, clock calendar, two serial ports, and game port .....	229.
Liberty Board 64k upgradeable to 2Mb, fully supports LOTUS/INTEL expanded memory specification (EMS) .....	297.
Quad Sprint w/8086 processor, increases the speed of your PC .....	479.
Microfazer Printer Buffer (parallel) w/compat MP 64 (64k) upgradeable to 512k .....	159.

## SMA

PC-Documente Keyboard Templates available for:

DOS/Basic 2.0-2.1	Supercalc 3
DOS/Basic 3.0-3.1	Wordstar
Lotus 1-2-3	Wordstar 2000
Symphony	Turbo Pascal
Framework	WordPerfect
dBase II	dBase III
Multitask .....	each 12.

## Toshiba

All Toshiba printers listed are 24 pin dot matrix.	
P1340 printer (80 column) .....	439.
P341 printer (136 column) .....	749.
P351 printer (136 column) w/serial and parallel interfaces .....	1129.
WICO	
Joystick .....	35.

## DRIVES

All floppy drives are completely pre-tested and are supplied with a printout of the test results. They are shipped with complete step-by-step installation instructions. Drives are 320k/360k.

## Control Data (CDC)

(5 1/4") half-height drive (DS,DD) .....	79.
--	-----

## IOMEGA

•Bernoulli Box 20 Meg .....	\$2349.
•10 Meg cartridge .....	48.
•Cleaning Care Kit .....	79.
•Standard Interface (PC2) Card .....	129.

## Mountain Computers

•Drive Card 20 Meg .....	call
--------------------------	------

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- COD max. \$1000. Cash or certified check.
- 120 day limited guarantee on all products.\*
- To order, call us anytime Monday thru Friday 9:00 to 9:00, or Saturday 9:00 to 5:30. You can call our business offices at 603/446-3383 Monday thru Friday 9:00 to 5:30.

## SHIPPING

**Continental US:** For monitors, printers, and drives, add 2% for UPS ground shipping. Call for UPS Blue or UPS Next-Day-Air. For all other items, add \$2 per order to cover UPS shipping. We will automatically use UPS 2nd-Day-Air at no extra charge if you are more than 2 days from us by UPS ground. **Hawaii:** For monitors, printers, and drives, actual UPS Blue charge will be added. For all other items, add \$2 per order. **Alaska and Outside Continental US:** Call 603/446-3383 for information.

## Seagate

20 Meg Internal Hard Drive (w/controller, cables, and manual) .....	\$489.
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## Shugart

10 Meg Internal Hard Drive (w/controller, cables, and manual) .....	369.
---	------

## Tandon

TM 100-2 (5 1/4") full-height drive (DS,DD) .....	95.
---	-----

## TEAC

FD-55B (5 1/4") half-height drive (DS,DD) .....	85.
---	-----

## Toshiba

•AT 360k Drive (5 1/4") half-height drive ...	99.
---	-----

## MEMORY

64k Memory Upgrade Set for IBM-PC or XT system board or any memory board	
150 nanosecond (set of 9) .....	15.
200 nanosecond (set of 9) .....	12.
Install memory upgrades & run diagnostics at time of board purchase only .....	10.
•128k Memory Upgrade Set for IBM-AT System Board (9 chips piggybacked) ..	39.
•256k Memory Upgrade Set for any IBM-AT memory board (9 chips) .....	39.

## DISKS

### D5/DD Disks for the PC & XT (40 TPI).

10 disks per box.	
Maxell MD-2 .....	19.
Verbatim Datalife .....	19.

### D5/High Density Disks for the AT (96 TPI).

10 disks per box.	
Fujitsu .....	35.
Maxell .....	39.
Verbatim .....	45.

•Flip Sort (holds 75 disks) .....	15.
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## INFORMATION SERVICES

### Compuserve

•Compuserve Information Service (includes subscription, manual, 5 hours of connect time, monthly publications) ...	27.
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### Dow Jones

•Membership Kit .....	19.
-----------------------	-----

### Source Telecomputing

•The Source (subscription and manual) ..	39.
--	-----

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# PC Persistence.

## Or, Paradise Revisited.

Remember this picture? We used it in our very first raccoon ad about two years ago. Back then we wrote your orders out by hand, and filed them on top of the fireplace mantle. 256K was a lot of memory. And, according to our calculations, only about 10% of the people now reading this ad even owned a PC.

But persistence has paid off. We've grown and thrived throughout all the trials and tribulations of the PC marketplace. Why we don't even have to sell moonshine anymore to make ends meet.

## Traditional values.

Shortly after our world famous micro mascot first plowed his way through your typical Marlow snowdrift, we cleared off the mantle and loaded everything into an IBM System 38. This mighty mainframe gives our sales consultants instant access to a multitude of mesmerizing minutiae. Like product availability, the status of your order, how much memory a program requires, what printers it supports, and whether a new version is expected soon.

With an ever-increasing array of electronic wizardry at their fingertips, our persistently pleasant phone people

can help you take your PC to new pinnacles of performance. You see, we still go to mind-boggling lengths to answer your *toll-free* technical questions—before or after the sale. We still guarantee every product we sell for a full 120 days, and many for longer than that. Our prices are still consistently among the lowest around. And, if a price ever goes down before we ship, you will automatically get the new low price.

## Only a 4.3 light year drive from Alpha Centuri.

Alas, Marlow, NH remains a bit off the beaten track for even the most adventuresome of our customers. But you still have a standing invitation to visit us the next time your business takes you to Boston, or pleasure takes you to the ski areas of Vermont and New Hampshire. This spring we'll be opening our completely renovated store and training center in the old Christmas Trees Inn (partially pictured above) across the river from our headquarters.

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For the IBM-PC (XT & AT) exclusively.

# PC CONNECTION

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# PC's LIMITED AT

*Faster and more flexible than IBM's AT, the PC's Limited product is also only about two-thirds the price.*

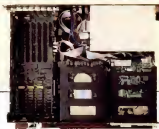
Not merely another AT clone, the PC's Limited AT offers an amazingly low price for a full system. It also claims faster performance and more versatility than the IBM original—and does a good job at delivering both.

On the surface, the PC's Limited AT is a perfect match for an official AT. Its sheet-metal case and molded-plastic front panel are identical in size, shape, and color to the IBM standard. Inside, too, the PC's Limited AT is a good match for IBM's AT; it has eight expansion slots, six of which feature the expanded AT-style 16-bit bus. Its case can internally accommodate a combination of two full-height hard disks and a half-height floppy, or two half-height floppies and a full-height hard disk with half a slot to spare. Functionally, however, the PC's Limited AT offers a number of improvements over IBM, all achieved without giving up hardware or software compatibility.



Above: The PC's Limited AT resembles the IBM AT in size, shape, and color.

Right: More flexible than the IBM AT, the PC Limited's Faraday Electronics ATease system board offers one parallel port and two serial ports, which can be configured to function as RS-232 or RS-422.



**FAST THINKER** The heart and brain of the PC's Limited AT is a Faraday Electronics ATease system board, which is based on the Intel 80286 microprocessor and has a socket for an optional 80287 co-processor. The Faraday board allows a degree of versatility unobtainable from IBM: It can handle either 64K-bit or 256K-bit RAM chips, allowing a total of 1,024K-bytes of RAM on the system board. The size and configuration of ROM chips that the system recognizes can also be altered,

making it easily adaptable for industrial applications that call for special, user-designed, ROM-resident routines.

The PC's Limited AT's standard 80286 chip runs at 8 MHz, but our test machine had an even higher-speed crystal installed—one set to operate the system at a blazing 9 MHz. On the Norton SysInfo test, this machine scored a whopping 7.7.



## FACT FILE

### PC's Limited AT

PC's Limited  
1611 Headway Circle, Bldg. 3  
Austin, TX 78754  
(512) 339-6800

**List Price:** 1,024K RAM, three ports, one high-density floppy (1.2 megabytes) combined floppy-hard disk controller, AT-style keyboard, 192-watt power supply, clock/calendar with battery backup, \$1,995  
**Options:** 20-megabyte hard disk drive, Hercules compatible monochrome graphics display adapter, Princeton Max-12 monitor  
**Microprocessor:** 80286  
**Clock Speed:** 8 MHz  
**Expansion Slots:** 8

**In Short:** A great bargain, this fast and powerful machine offers more flexibility than IBM's AT.

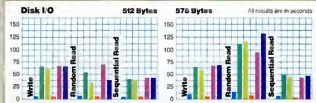
CIRCLE 100 ON READER SERVICE CARD



## BENCHMARK

### PC's Limited AT vs. IBM PC AT

PC's Limited AT  
IBM PC AT



The disk I/O test measures the time it takes to create a 200K-byte data file using record lengths of 512 bytes and 576 bytes, and then perform a random read of 256 records from the created file, followed by a sequential read of the same records. It compares the PC's Limited AT's hard, quad-density floppy, and double-density floppy drives with the IBM PC AT's.



The prime number calculation test measures the speed at which the compiler can find all the prime numbers between 1 and 50.

The compiler or program development test measures the speed of a two-step, self-tuning DOS batch file using the IBM Personal Computer Linker program. Stage 1 takes a 34-line assembly code file (ASM), converts it to binary code, and links it with other binary files to make

an executable (.EXE) file. Stage 2 compiles and links source code to resolve address references and make an executable file.

This test assesses the integration of the system as a whole, concentrating on the interaction between the hard disk, microprocessor, and RAM.

This database applications test assesses hard disk processor interaction by performing a series of disk-intensive dBASE III, Version

2.01 tasks. The self-tuning DOS batch file runs a total of six dBASE routines on 81 individual database records consisting of 164 bytes each, sorting on a database file (.DBF), indexing on 2 of the 13 data fields in each record, copying to a temporary database file, setting two indexes on a database file and appending a record, and deleting a record and packing physical removal of deleted records; the database file.

Designed for a 640K environment, this spreadsheet applications test assesses the computational speed and RAM management capabilities of the machine by using a 1-2-3 macro that performs a series of both global and individual worksheet tasks. The macro copies and recalculates a 10-cell range 492 times, moves 1,000 cells, deletes 1,000 cells, and then systematically clears the spreadsheet.

*The PC's Limited AT runs just about even with the IBM AT on disk I/O tasks but surpasses it on applications tests where its high clock speed pays off.*

The exact configuration of the Faraday system board is set by moving jumpers rather than by setting DIP switches. Jumpers can be inconvenient; you may require long-nosed pliers to change them. DIP switches can be tripped with a more readily available tool—a ballpoint pen. The PC's Limited AT's many jumpers are also inconveniently positioned.

**MANY OUTS** The system board features enough input/output circuitry to provide up to a single parallel port and a pair of serial ports, all without any of the addi-

tional penalties that IBM imposes when you want to add these conveniences. (To avoid hardware conflicts, any or all of these ports can be turned off—with jumpers, of course.)

The PC's Limited approach to serial ports is particularly enlightened. A few of the many jumpers allow you to configure the serial ports to function according to either the IBM AT 9-pin or the PC 25-pin standards. Other jumpers allow these ports to follow the RS-232C or RS-422 communications standards.

The PC's Limited AT solves the prob-

lem of having to give up an expansion slot merely to provide room for interface connectors. The back panel of its case features cutouts for mounting up to three 25-pin and two 9-pin DB-style connectors without wasting a slot.

**KEY COMPATIBILITY** The standard keyboard shipped with current models of the PC's Limited AT duplicates the IBM PC AT keyboard layout with large Enter and Shift keys, the Backslash and Esc keys moved to the right, and Shift indicators above the numeric keypad. The PC's Limited version is much less weighty and has a lighter, quieter touch that nevertheless gives genuine tactile feedback with a positive snap action.

Standard mass storage equipment includes a single Mitsubishi 1.2-megabyte, half-height floppy operated by a Western Digital combined hard disk/floppy controller. As in IBM's AT, space is allowed for both an additional half-height floppy disk and two full-height hard disk drives. AT-style mounting rails are used for all drives.

PC's Limited also supplied a 20-megabyte Seagate hard disk in the review machine. On the Core International DISKP test that I subjected the machine to, this drive easily met the AT's performance specifications for under-40-millisecond average access time. Although only prolonged use will determine the sturdiness of this drive, it does have a built-in park-and-lock feature that keeps the read/write heads from crashing into the user portion of the hard disk surface when the machine is turned off.

The documentation I received was in very rough, preliminary form, essentially a Xeroxed copy of typeset artwork for a pamphlet. The information it contained was clear, but adequate rather than exhaustive. It should be sufficient to get a new user started, but it falls far short of the IBM standard in completeness.

The PC's Limited AT proved to be the functional equivalent to the IBM product, only faster. Priced at roughly one-third less, it rates as one of the best bargains available. ■

*Winn L. Rosch is a contributing editor of PC Magazine.*

# SPERRY PC/IT PERSONAL COMPUTER

*It may not be the sleekest or the cheapest, but the PC/IT has the storage and multiuser capabilities power users want.*

**T**he Sperry PC/IT Personal Computer will never win any design awards or ergonomic kudos, but its powerful and sophisticated computing capabilities are hard to ignore.

Most users are more interested in how a computer works than how it looks; Sperry is apparently betting on the machine's superior features to sell the unit. That approach is not without merit. Compared with the AT, the Sperry IT features a higher processing speed, double the memory expansion capabilities, and double the mass storage capacity. Also, it can accommodate up to eight remote workstations under XENIX System V.

**POWER TO SPARE** The Sperry is obviously aimed at the power user: Its 80286 chip runs at 8 MHz, although it can operate



Above: Although it seems much larger than the AT, the Sperry PC/IT is only 22 x 17 inches.

Right: Inside the system box, the IT's construction looks sturdy. The layout is clean, and there is plenty of space. The 512K bytes of RAM can be doubled on the system board, saving expansion slots.



at 6 or 7.16 MHz if necessary. There is also a 80287 socket. The standard 512K bytes of RAM can be doubled on the system board, saving some of the eight expansion slots. Six of the slots will take 16-bit cards. The IT's total memory capacity is an impressive 5 megabytes.

Other standard features include a battery-backed clock/calendar, two RS-232 ports, one Centronics printer interface, a built-in diskette controller, and a 1.2-megabyte high-density floppy disk drive. The system can handle three additional storage



## FACT FILE

### Sperry PC/IT Personal Computer

Sperry Corp.  
P.O. Box 500  
Mailstation B-200  
Blue Bell, PA 19424  
(215) 542-4011

**List Price:** For 512K RAM, 1.2-megabyte floppy disk drive, AT-compatible keyboard, monochrome display, and operating system, \$4,340

**Options:** Increase to 1 megabyte without using additional slots; increase to 5 megabytes with memory board; 44.6-megabyte hard disk drive, 60-megabyte tape backup.

**Microprocessor:** 80286

**Clock Speed:** 8 MHz

**Expansion Slots:** 8

**In Short:** It may look large and awkward, but this powerful machine offers speed, mass storage, and multiuser capabilities.

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**N**ORTON CHRONICLES  
**O**PERATING SYSTEMS  
**P**RISE WATERHOUSE REPORT  
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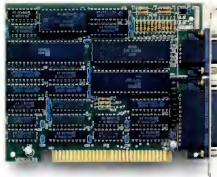
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CIRCLE 361 ON READER SERVICE CARD

PC26

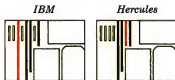


## Why the Hercules Color Card is better for your XT than IBM's.

Did you know that there's a color graphics card specially designed for the XT? It's called the Hercules Color Card. We think that it's better for your XT than the IBM Color Graphics Adapter. Here's why.

The XT comes with an empty short slot. IBM's card is too long to fit in it, so you're forced to sacrifice a valuable long slot, while your XT's short slot goes unused.

The Hercules Color Card is designed to fit in this short slot. It's the smartest way to maximize the usable slots in an XT and provide for your future expansion needs.



*Notice how much more efficiently Hercules makes use of the XT's slots.*

Our efficient use of an XT's slots is not the only reason to buy a Hercules Color Card instead of IBM's. We give you a parallel printer port at no extra cost. (IBM charges extra and takes up another slot.)

A lot of people wonder how Hercules can do everything that IBM can in a card less than half the size. We do it by designing our own graphics microchips. Just one of our chips packs the punch of dozens of IBM's, reducing by more than 50% the number of components that can fail.

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Hercules	2 years

And you'll have to give up a dollar. The Hercules Color Card is \$245—IBM's is \$244.

Look into the Hercules Color Card for the XT, PC or AT. Find out why the readers of *PC World* voted the Hercules Color Card 1985's best color graphics card—ahead of IBM's. Call 1 800 532-0600 Ext. 420 for the name of the dealer nearest you and we'll rush you our free info kit.

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options, so that you can mix and match a 360K floppy, 60-megabyte cartridge tape backup, and a huge 44.6-megabyte hard disk. The IT can support two hard disk drives, pushing your maximum internal storage over 90 megabytes—enough to satisfy all but the most power-hungry users. A front-mounted hardware reset button is recessed under the in-use lights.

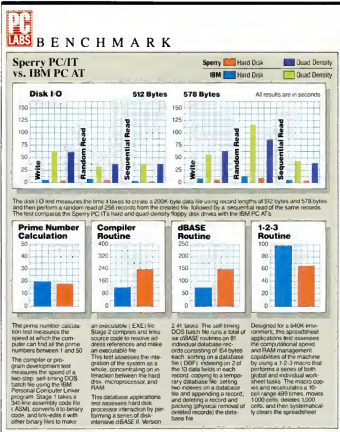
Sperry supplies a plug-compatible Key Tronic keyboard; the bad news is that it features the somewhat slushy Key Tronic action. In fact, you can choose among three keyboards: the Standard, the Professional, and the Advanced. The former two are close relatives of the regular PC keyboard, and the latter is a variation on the AT's keyboard. All improve on the IBM's key placement (they are Selectric-style), but not on its typing comfort.

Sperry also offers three monitors, a high-resolution, 12-inch monochrome display, and both medium- and high-resolution color models. The medium-resolution color model that came with the review machine has one very interesting feature: a center-adjust knob that mechanically centers the screen image. This potentially useful feature doesn't make up for the monitor's basic problem: a screen image that is just plain poor. Because it's highly reminiscent of the basic IBM PC color monitor (meaning you can count the dots on the screen), I wouldn't recommend it for word processing or any other extended stints.

The monochrome display (720- by 350-pixel resolution) or the high-resolution color display are better choices. The high-resolution color display can generate 16 colors out of 256 in the 640 by 400 and 640 by 200 modes, or 256 colors simultaneously in the 320 by 200 and 320 by 400 modes if you have software to support it.

**HIGH-SPEED HARD DISK** On PC Magazine Labs benchmark tests, the IT was generally a strong performer. Compatibility was not an issue, with one exception. Most PC software ran as well on the IT as on any other machine, but I had trouble booting *Jet*, a flight-simulation game. Check your applications before investing in an IT, especially graphics-intensive packages.

The IT's hard disk is not only huge, it's very fast. The Core International test



*The PC/IT fared surprisingly poorly on the number calc test considering its high clock speed, but made up for it with good disk access speed.*

called it one of the fastest available, and it pretty much blew the socks off the other 3 machines I tested during the disk-access benchmarks. The machine faltered during the prime-number benchmark, however, turning in one of the slowest performances in the PC Magazine Labs tests. Overall, the IT's performance rates as very good.

**WHAT DO YOU DO WITH IT?** Unless you do need a multiuser system, though, think long and hard. As a single-user setup, the IT doesn't make much sense to me. The ergonomic drawbacks (no tilt-and-

swivel monitor and a poor keyboard, for starters) are worth considering. So is the price—a color system with a hard disk will run you close to \$8,000.

If you are choosing between IBM and Sperry, pick the IT over the AT. It is generally well built, extremely capable and powerful, and easily outshines the AT on many counts, especially if you improve the monitor and keyboard. But if you can live with a meager 20- or 30-megabyte hard drive, other options reviewed in these pages might save you money and offer equal or better performance. ■

# BASIC TIME BT/AT

*Basic Time's BT/AT is a true IBM PC AT clone, with some slot-saving extras and a much lower price.*

The Basic Time BT/AT is a true IBM PC AT alternative. It looks and works almost exactly like a PC AT, but it includes built-in I/O ports, can carry more memory, and has a much lower price than IBM's machine.

On the outside of the BT/AT, you will see the familiar keylock and half-height disk-drive mechanisms. The cabinet of the BT/AT is made of heavy-gauge metal and the finish is good. The keyboard is interchangeable with the one that comes with the PC AT. However, an experienced eye can tell a BT/AT by glancing at the back panel: This machine includes three standard DB-25 connectors for its one parallel and two serial ports. If you buy a BT/AT, you can avoid the hassle of trying to match the 9-pin connectors IBM uses.

When you take the cover off the



Above: Basic Time's BT/AT looks like the IBM AT from the front, but the back panel, offering three standard DB-25 connectors for its one parallel and two serial ports, shows that Basic Time is no mere mimic.

Right: The multifunction card made by Basic Time gives the BT/AT more memory.



BT/AT, you'll spot other differences. The Basic Time system uses 256K-bit RAM chips instead of the piggyback chips used by IBM, and the latest version of its motherboard, which started shipping in December 1985, can hold up to 2 megabytes of RAM.

The version of the Basic Time system that PC Magazine Labs tested operated at 6

MHz. The company says it doesn't recommend changing the crystal for faster operation because of potential problems with peripherals at faster speeds. However, it also said that the version of the BT/AT



## FACT FILE

### BT/AT

Basic Time Inc.  
3350 Scott Blvd., Bldg. 52  
Santa Clara, CA 95054  
(405) 727-0877

**List Price:** For 640K RAM, 195 watt power supply, one 1.2-megabyte and one 360K floppy disk drive (or two 360K drives), 44-megabyte hard disk drive, two serial ports, one parallel port, 84-key AT keyboard, MS-DOS 3.1, GWBASIC, monochrome adapter card, monochrome monitor, \$4,495

**Options:** 8-MHz clock speed, memory to 4 megabytes, serial ports 1-4, parallel printer ports, game port, 70-megabyte hard disk drive, color monitor, 60-megabyte tape drive.

**Microprocessor:** 80286

**Clock Speed:** 6 MHz

**Expansion Slots:** 8

**In Short:** A low-priced AT alternative that closely matches the IBM original in looks and performance.

**CIRCLE 88 ON READER SERVICE CARD**

# DB•Task™

## Multi-User Database Application System

Until now, if you needed database management, you had two choices... learn a whole new language, or settle for a weak-featured "electronic file cabinet". Well now there's DB•Task™! The only "task-oriented" database manager simple enough for non-programmers, yet powerful and challenging enough for the seasoned database pro!



The relational, multi-file qualities of DB•Task make it simple to create up to 99 interactive applications, each with up to 99 defined "tasks", all managed transparently by DB•Task within hierarchical scrolling menus. Application development has never been so robust... so elegant!

### Task Oriented

The idea behind a database manager is not only to enable the user to store and retrieve data, but to make it possible to be productive with that data... to accomplish objectives. In short, to perform tasks. That's where DB•Task comes in.

Within any DB•Task application, a "task" may be as simple as a screen full of "read only" reference information, or as complex as a 9-screen, multi-file posting job, all without programming!

However, if you WANT to program, just sink your teeth into our super-macro language using our built-in text editor. Up to 99 super-macros can be created for any one "task" and called easily from a scrolling macro menu.

### Multi-User

Like any serious database manager, DB•Task has full multi-user capability, maintaining 100% data integrity while never locking a user out of files OR records! And of course, DB•Task also comes in a single-user version. All single-user applications are fully accessible by the multi-user version.



### Our Features Speak For Themselves

- **Parameter Driven** - No programming required.
- **Screen Manager** - Free form screen design with built-in text editor, lightning fast displays.
- **Scrolling Menus** - User-maintained menu system.
- **Multiple Screens** - Up to 9 variable size screens with up to 99 fields each allowed per "task" (891 fields total).
- **Auto Screen Advance** - Optionally set automatic screen advance, forward and backward.
- **Field Attribute Control** - User-defined data entry checking by field: Min/Max values; On screen formatting of numeric fields; Field justification; User-defined field defaults including system date or time; or the contents of another field. Calculated fields; Invertible fields; Mandatory fields; Jumpier fields (for field back control); Data option (to copy contents of field from previous record); Mask-fill fields; Table look-up fields (no limit on table size); Data pull fields (retrieve data from another file for display or for input into current "task"); Optional "auto carriage return" by field; Modifiable "pad" character per field.
- **User ID** - Application access controlled by ID entry.
- **User Authorities** - Read, read/modify, read/modify/macro levels set per "task".
- **Multi-file** - Up to eight file update or posting commands may be incorporated into one "task" under full transaction processing control. If one filing instruction fails, all filing instructions in the "task" are aborted. File consistency is protected.
- **B-Tree Files** - Split second data retrieval on indexed fields.
- **Unlimited Records** - Data file size is limited only by your hardware, not our software.
- **Large Records** - Records may be up to 4000 bytes in size.

- **24 Index Fields** - DB•Task automatically maintains up to 24 sorted index paths to your data files at the time each record is added to the file. No sorting needed. Index fields may hold unique or non-unique values.
- **File Browsing** - Scan records in data files forward or backward.
- **Disk Space Maintenance** - Any disk space vacated by a deleted record is automatically reused by DB•Task. No need to "pack" or "compress" data files.
- **Macro Facility** - An extended macro language provides file access, calculations and output to screen, printer or disk file. Output to pre-printed forms, columnar layout for reports, to labels, or whatever you please.
- **Query Processor** - Powerful on-line query processor for ad hoc list and report generation, using our simple "point and select" method.
- **Cache Buffer** - File I/O is optimized by automatic cache buffer, limiting the number of physical disk accesses.
- **Crash Protection** - System crash due to electrical surges or loss of power will not affect the integrity of your data files.
- **DOS Access** - Execute DOS commands from within DB•Task.
- **Text Editor** - Built-in text editor for use in screen design, macro creation, or for notes and correspondence.
- **Printer Control** - Send any control characters to your printer with our macro language.
- **Calculator** - Pop-up four function calculator built in.
- **File Conversion** - Easily interchanges data with many other popular programs.



### 30 Day Money Back Guarantee

If during the 30 days following your receipt of DB•Task you are not fully satisfied, return the disks and documentation in good condition for a full refund. (Does not apply to non-copy protected versions)

**Hardware Requirements:** IBM PC, XT, AT; 512K RAM; DOS 2.0 or later; 80 column display (monochrome or color); two 360KB drives; hard disk highly recommended.

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Mail to:  
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Madison, WI 53703

scheduled for shipment in December would have both 6- and 8-MHz crystals installed.

Of the BT/AT's eight expansion slots, six are PC AT compatible and two are PC compatible. The disk controller and video controller each take a slot, so a practical system has four slots open. The extra memory and I/O ports on the BT/AT's motherboard have the effect of adding at least one slot. The circuit boards have a professional appearance, and the fit is excellent.

Basic Time makes its own multifunction card to give the BT/AT even more

■ The BT/AT doesn't offer a speed advantage over the IBM AT, and its advantage of added ports and memory can be neutralized. In the end it has to compete on price.

memory and I/O capability, and it offers a variety of optional hard disk drives with capacities up to 70 megabytes.

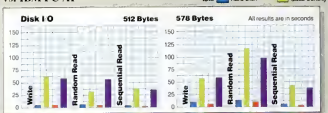
**PERFORMANCE** The BT/AT we tested was a trifle slower than the IBM PC AT in the CPU-intensive prime number calculation. However, the hard disk drive was faster than the average AT's. Peter Norton's SysInfo utility program rates the BT/AT's system at an index of 5.7 (the AT's rating is 5.9). The difference was erased when other more I/O-intensive benchmarks were run. Looking at the results as a whole, it is fair to say that the BT/AT performed identically with an AT in tests of practical applications.

Basic Time supplies both MS-DOS and GWBASIC with its system. Including a good BASIC interpreter with the system is another way this company tries to package the BT/AT for value. The MS-DOS diskette includes setup utilities that allow re-



## BENCHMARK

### Basic Time BT/AT vs. IBM PC AT



The disk I/O test measures the time it takes to create a 200K-byte data file using record lengths of 512 bytes and 578 bytes and then perform a random read of 256 records from the created file, followed by a sequential read of the same records. The test compares the Basic Time BT/AT's hard and quad-density floppy disk drives with the IBM PC AT's.



The prime number calculator test measures the speed at which the computer can find all the prime numbers between 1 and 50.

The compiler or program development test measures the speed of a two-step, self-timing DOS batch file using the IBM Personal Computer Linker program. Stage 1 takes a 341-line assembly code file (ASML) converts it to binary code, and links code it with other binary files to make

an executable (.EXE) file. Stage 2 compiles and links source code to resolve address references and make an executable file. This test assesses the integration of the system as a whole, concentrating on interaction between the hard disk, microprocessor and RAM.

This database applications test assesses hard disk processor interaction by performing a series of disk-intensive dBASE III Version

2.4L tasks. The self-timing DOS batch file runs a total of six dBASE routines on 81 individual database records consisting of 164 bytes each, sorting on a database file (DBF), indexing on 2 of the 13 data fields at each record, copying to a temporary database file, sorting two indexes on a database file and appending a record, and deleting a record and placing (physical removal of deleted records) the database file.

Designed for a 256K environment, this spreadsheet applications test assesses the computational speed and RAM management capabilities of the machine by using a 7-2-3 macro that performs a series of both global and individual worksheet tasks. The macro copies and recalculates a 10-cell range 49 times, moves 100 cells, deletes 100 cells, and then systematically clears the spreadsheet.

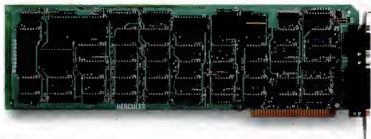
*The BT/AT displays good disk I/O speed, especially its hard disk, but offers poor calc speed. The result: performance that is even with the IBM AT in applications tests.*

direction of the ports and other useful features. PC-DOS 3.1 runs on the BT/AT with no problems; the machine reads and writes to 1.2-megabyte disks formatted on an AT.

Documentation tends to be a weak point in many IBM-alternative machines, so I was pleased to see that the Basic Time machine bucks this trend by coming with good documentation. The manuals clearly describe setup and operation of the system, and it is easy to find references. The GWBASIC and MS-DOS manuals are standard publications.

**THE ALTERNATIVE** The BT/AT we tested didn't offer a speed advantage over an IBM PC AT (although units available now might), and its technical advantage of added ports and memory can be neutralized by multifunction boards. In the end, the BT/AT has to compete on price. In this area, it easily undercuts IBM's and Compaq's offerings and gives other alternatives a close shave. You may find AT alternatives at lower prices, but you may have to sacrifice dealer support, system quality, and delivery. The BT/AT is a solid performer without compromise.

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# ZENITH DATA SYSTEMS Z-158

*A superfast XT-compatible, the Z-158 offers great expandability, reasonable price, and good ergonomics.*

**Z**enith is a quiet but effective competitor in the microcomputer marketplace. The company doesn't get much press, but its salespeople consistently win major contracts to supply the Department of Defense, state governments, and Fortune 500 companies with large orders for microcomputer systems. It also supplies major subassemblies for other companies, including IBM. The display in the IBM PC Portable carries Zenith markings. Zenith's computers are assembled at the Zenith/Heath plant in Benton Harbor, Michigan, and they are also available through Heath dealers.

**OLD DOGS, NEW TRICKS** The Zenith Data Systems Z-158 is a low-cost alternative for anyone wanting faster processing and PC-XT compatibility. It squeaked into our "AT Alternative" category by virtue of an 8088 processor running at 8 MHz.



Above: Zenith offers a number of monitors for the Z-158, including an RGB system with a switch that allows you to turn it into a "green screen" for word processing.

Right: The Zenith Data Systems Z-158 is a fast XT-compatible using an 8088 processor capable of running at two different clock speeds.



Members of the engineering staff at Zenith said they can run this chip (the same one used in the PC and PC-XT) at nearly twice its normal speed because of the high-quality chips they receive. One engineer told me, "As the manufacturing experience grows, the yield gets better."

Owners of older Z-150 series systems can't speed up their machines by popping in a new crystal, as some PC AT owners

can. Other components have to be chosen to operate at the higher system-clock speed.

Since this speedup is not accompanied by faster disk access or a wider data path,



## FACT FILE

### Zenith Data Systems Z-158

Zenith Data Systems  
1000 Milwaukee Ave.  
Glenview, IL 60025  
(312) 391-8860

**List Price:** With 256K RAM, two floppy disk drives, one serial port, one parallel port, and color-graphics adapter, \$2,499

**Options:** 10-megabyte hard disk drive, on-board expansion to 640K RAM.

**Microprocessor:** 8088-2

**Clock Speed:** 8 MHz or 4.77 MHz

**Expansion Slots:** Five IBM PC, one Zenith.

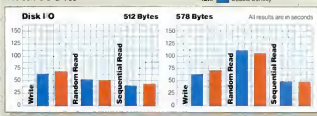
**In Short:** An XT alternative with proven software compatibility, whose 8088 CPU runs at a fast 8MHz.

CIRCLE 688 ON READER SERVICE CARD

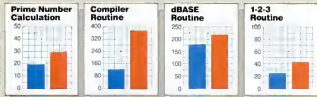


## BENCHMARK

### Zenith Z-158 vs. IBM PC AT



The disk I/O test measures the time it takes to create a 200K byte data file using record lengths of 512 bytes and 578 bytes and then perform a random read of 256 records from the created file, followed by a sequential read of the same records. The test compares the Zenith Z-158's double-density drive with the IBM PC AT's.



The prime number calculation test measures the speed at which the compiler can find all the prime numbers between 1 and 50.

The compiler or program development test measures the speed of a two-step, self-timing DOS batch file using the IBM Personal Computer Linker program. Stage 1 takes a .c file, converts it to binary code, and links it with other binary files to make

an executable (.EXE) file. Stage 2 compiles and links source code to resolve address references and make an executable file.

This test assesses the integration of the system as a whole, concentrating on interaction between the floppy drive, microprocessor, and RAM.

This database applications test assesses floppy drive processor interaction by performing a series of disk-intensive dBASE III, Version

2.41, tasks. The self-timing DOS batch file runs a total of six dBASE routines on 81 individual database records consisting of 154 bytes each (spinning on a database file (DBF), indexing on 2 of the 13 data fields in each record, copying to a temporary database file, setting two indexes on a database file and appending a record and deleting a record and packing (physical removal of deleted records) the database file).

Designed for a 256K environment, this spreadsheet applications test assesses the computational speed and RAM management capabilities of the machine by using a 1-2-3 macro that performs a series of both global and individual worksheet tasks. The macro copies and recalculates a 10-cell range 40 times, moves 100 cells, deletes 100 cells, and then systematically clears the spreadsheet.

*An 8-MHz clock speed doesn't help the Z-158 overtake an AT running at 6 MHz. The Z-158's 8-bit microprocessor is probably the reason. The machine's disk access is good.*

its effect is mainly limited to CPU-intensive computing tasks. This CPU will recalculate spreadsheets and plot graphs faster than a Z-150, but factors such as disk-access speed may play a bigger role in the performance of other tasks. For example, a standard IBM PC with a processor operating at 4.77 MHz takes 45 seconds to run the PC Magazine Labs prime number calculation benchmark. The Z-158 at 8 MHz does the same test in 30 seconds, but a PC AT, running at 6 MHz with a wider data path and more internal integration of the processor, does it in 20 seconds.

**EXPANSION AND PRICE** Government evaluators place high value on the number of free expansion ports in a standard system, on ergonomic factors in the display, and on price. The Z-158 seems to be designed in response to these factors. Serial and parallel ports, a color graphics capability, and the disk controller are included in the standard system, and you can install a full memory load of 640K bytes without using an expansion slot. The typical 512K-byte RAM Z-158 with color graphics and floppy disk drives has five IBM PC-style expansion slots free.

Appropriately for a company known for its television sets, Zenith makes a full line of monitors with many different features. The monochrome monitor on the test machine had an easy-to-read amber display, and the RGB color system has a feature that allows you, by pulling one switch, to turn it into a "green screen" for text processing.

When you read Zenith's list price of \$2,499, keep in mind that a color video adapter (but not a monitor) is included. The Z-158 isn't the cheapest XT-compatible you can buy, but it is deeply discounted in large quantities and retail dealers seem to follow similar discounting practices.

**CONSTRUCTION** Zenith adopted a card-slot technology for its entire system. CPU, video, and memory cards (each with many other functions) occupy slots in a unique Zenith bus. This bus approach simplifies factory or dealer troubleshooting, and it should mean that major repairs cost less. Governmental or corporate centers doing their own troubleshooting can stock a few boards and quickly swap them out without going through the process of removing and replacing an entire motherboard because one soldered-in chip has gone bad. Similarly, major system upgrades are easier if they just involve swapping one card out of the set. The Z-158 comes with one Zenith bus-slot empty.

Zenith has made improvements to the IBM PC keyboard while maintaining compatibility. The Return, Tab, Shift, and Ctrl keys are all oversized, and the CapsLock and NumLock keys have LED lights. The Ctrl key is in a location that WordStar users will appreciate. An Enter key is next to the numeric pad for people who key in a lot of numbers.

**COMPATIBILITY** Experience has proved the Zenith Z-150's compatibility with IBM PC software and expansion hardware. A 4.77-MHz mode is available to provide for copy-protected diskettes or programs that can't operate in the faster mode.

The Z-158 is a reliable and economical system. Its processor speed should appeal to spreadsheet wizards who want something faster than a standard PC while keeping complete PC compatibility. ■

# VICTOR VPC

*Victor Technologies' XT-compatible VPC is too much like the IBM product in both features and price to be very attractive.*

**V**ictor, the computer company that went into Chapter 11 reorganization in early 1983, has come back from the grave with the VPC, a solid, workmanlike PC-XT-compatible. It's a conservative machine that uses the same Intel 8088 chip as the PC family and advances only cautiously beyond the limits of the standard IBM configuration. Victor has actually taken IBM compatibility a little too far; its prices are nearly compatible. Unless you can get a VPC at a sharp discount, I can't see a compelling reason to buy one.

In addition to a single 360K floppy disk drive, the standard machine comes with a 15-megabyte hard disk. (Its 15-megabyte hard disk, by the way, is what justified the VPC's inclusion in this survey.) This drive takes you a step past IBM's 10-megabyte disk, and for another \$1,000 (hardly a bargain), you can get a 30-megabyte internal fixed disk instead.

Unlike the XT, which has floppy and hard disk controllers on separate boards,



Above: Along with an IBM-style layout, Victor Technologies VPC's keyboard features flip-down legs and LED indicators on the CapsLock and NumLock keys.

Right: The XT-compatible VPC uses an 8088 chip and has six compatible full-size expansion slots and one half-size slot. A single controller card drives two floppies and the hard disk.



the single Victor controller card can drive two floppies as well as the hard disk. Since the power supply puts out a full 135 watts, the VPC is ready for you to add capabilities. However, Victor plods along in IBM's footsteps by giving you an antique, full-height Tandon for your first floppy

disk drive. If you want two in-board floppies, you'll have to buy two new half-heights and junk the Tandon—not a satisfying upgrade.



## FACT FILE

### VPC

Victor Technologies Inc.  
380 El Pueblo Rd.  
Scotts Valley, CA 95066  
(408) 438-6680

List price: Two 360K floppy disk drives,  
256K RAM, keyboard, \$1,995  
Options: Monitor, color boards, expanded  
RAM, serial port, high-resolution graphics,  
15-megabyte and 30-megabyte hard disk  
drives, video cards.

Microprocessor: 8088

Clock Speed: 4.77 MHz

Expansion Slots: 7

In Short: An XT-compatible that is so similar to the IBM original in features and performance that it offers few advantages.

CIRCLE 888 ON READER SERVICE CARD

The bare Victor box has six XT-compatible, full-length expansion slots and one half-sized slot, as opposed to the XT's eight full-length slots. IBM takes up one slot each for the floppy controller, hard disk controller, and video card, leaving you five slots to grow into. Victor fills two slots with disk controllers and video, leaving you only four and a half slots for expansion. The machine does come with a built-in parallel port, though, which partially makes up for the low slot count.

The standard VPC comes with 256K bytes of RAM on the system board and no empty RAM sockets. However, you can

easily replace the 64K-bit chips with 256K to bring the motherboard total to 640K bytes—and save some slot space over the XT, which is stuck at a motherboard total of 265K. Like IBM machines, the VPC also has an empty socket for the 8087 math coprocessor.

The keyboard, though not as crisply responsive as IBM's, is one of the better imitations. The touch is firm and when a key connects, you can both hear and feel it. The keyboard has flip-down legs and comes with handy LED indicators on the CapsLock and NumLock keys. Victor has also gone with the traditional IBM Selec-

tric-style layout, with the last Shift key next to the Z rather than on the far side of the Backslash key.

You can buy the machine without a monitor, but the image on the Victor color screen is almost exactly like that of an IBM monitor. Victor improves on IBM with a well-designed, tilt-and-swivel base for its monitor; there is also a button on the front that lets you switch between color and green monochrome. The resolution doesn't change, however, so green-mode text doesn't have the sharpness of the IBM monochrome display.

Overall, the VPC is a solidly built box that has about as much structural steel as an XT. Its footprint and styling are also about the same. My only real objection to its layout is the location of the on/off switch—smack on the back panel, which is a long reach away.

The VPC comes with MS-DOS, Version 2.11, and a Victor version of BASICA. The DOS disk I got with the machine was a dud that wouldn't even format a disk, much less run a program. However, PC-DOS 2.1 and 3.1 both run beautifully, a good sign of IBM compatibility. The machine runs IBM software like *1-2-3*, *dBASE II*, *The Final Word*, *ThinkTank*, and *Microsoft Word* without a hitch, and Victor claims not to have found anything the VPC won't run, even under its own version of DOS.

VPC's documentation is its weakest feature. Its DOS and BASIC manuals are skimpy by comparison with IBM's, and the user guide is both minimal and obscure. The Taiwan-made color monitor comes with its own little brochure and spec sheet that are written in a Chinese approximation of English.

The VPC is a good copy of an XT with a few extras that IBM left out, but it's not a machine that dazzles or excites. Victor, a 68-year-old company best known for its calculators and cash registers, has always oriented its sales strategy toward Europe rather than the United States. Maybe the competition's not as fierce in Europe, but if Victor wants its PC to catch on in America, it will have to cut the price or soup up its computer.

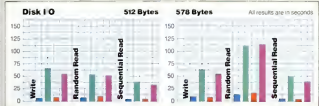
Jared Taylor is a contributing editor of PC Magazine.



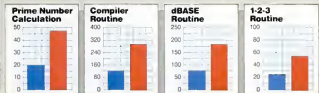
## BENCHMARK

### Victor VPC vs. IBM PC AT

Victor Hard Disk Double Density  
IBM Hard Disk Double Density



The disk I/O test measures the time in seconds it takes to create a 200K-byte data file using record lengths of 512 bytes and 578 bytes and then perform a random read of 256 records from the created file, followed by a sequential read of the same records. The test compares the Victor VPC's hard and double-density floppy disk drives with the IBM PC AT's.



The prime number calculation test measures the speed at which the computer can find all the prime numbers between 1 and 50.

The compiler or program development test measures the speed of a two-step, self-tuning DOS batch file using the IBM Personal Computer Linker program. Stage 1 takes a 341-line assembly code file (ASM) converts it to binary code and inverts it with other binary files to make

an executable (.EXE) file. Stage 2 compiles and links source code to resolve address references and make an executable file. This test assesses the integration of the system as a whole, concentrating on interaction between the hard disk, microprocessor, and RAM.

This database applications test assesses hard disk processor interaction by performing a series of disk-intensive dBASE II, Version

2.41 tasks. The self-tuning DOS batch file runs a total of six dBASE routines on all individual database records consisting of 154 bytes each, sorting on a database file (.DBF), indexing on 2 of the 13 data fields in each record, copying to a temporary database file, setting two indexes on a database file and appending a record, and deleting a record and packing (physical removal of deleted records) the database file.

Designed for a 256K environment, this spreadsheet applications test assesses the computational speed and RAM management capabilities of the machine by using a 1-2-3 macro that performs a series of both global and individual worksheet tasks. The macro copies and recalculates a 10-cell range 49 times, moves 100 cells, deletes 100 cells, and then systematically clears the spreadsheet.

The limitations of the 8088 microprocessor in the VPC show in this face-off with an 80286-equipped AT. The VPC's floppy drive did well in I/O tests but its hard disk did not.

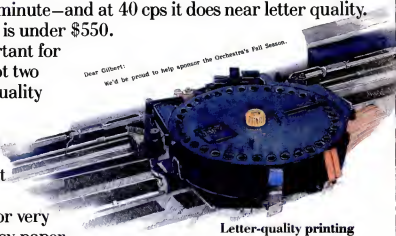
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## Review The INS Cast and Discover Premiere PC-to-Host Communications

The curtain is rising on a new era of PC-to-host communications as the INS Gateway PC Adapters make their debut in the latest production from Integrated Network Systems.

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The SDLC Gateway PC Adapter connects to any host supporting SNA/SDLC control units via leased or switched lines. Up to 32 PC's in your network can appear as logical units to the host, each with file transfer capability.

The 8100 Gateway PC Adapter connects to the multi-use communications loop of the IBM 8100 Information System, while the X.25 Gateway PC Adapter allows connection to public or private X.25 networks using switched or permanent virtual circuits to hosts supporting SNA 3270 control units. Both provide file transfer for as many as 32 network connected PC's.

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- ★ On board microprocessor

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Two terminal sessions and one printer session per PC

A feature common to both the Gateway PC Adapters and the INS PC Adapters is the Application Program Interface (API). The API enables user-written programs to perform operations as simple as automatic logon or as complex as transaction routing and data store and forward.

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# BUILDING A BETTER MOUSE INTERFACE



*New programming systems for mice make it possible to adapt them for use with any applications program. One of these products should make even a confirmed mouse-hater admit that mice can make some software easier to use.*

When the little pointing device known as the mouse was first introduced, battle lines were quickly drawn. The "mouseophiles" raved over how quickly the cursor could be moved to a specific spot on the screen, how easily a segment of text could be highlighted by dragging the mouse, how intuitive mouse operation became, and, of course, how appropriate mice were for drawing and other graphics applications. The "mouseophobes" ranted that if men were meant to use mice they would have three arms, that throughput might actually decrease for a fast typist because the hands had to leave the touch-typing home position, and that their desks never had any empty space on them to move the mouse over.

The furor has died down a bit with the passage of time. All but the most rabid mouse-haters have found that mice are convenient for certain operations, especially those that require a lot of cursor movement. Many users feel that while a keyboard is best for text entry, a mouse can be a great help in editing. Spreadsheets and windowing software have also converted a number of keyboard fans into mouse aficionados.

Unfortunately, software makers haven't been so quick to catch on. Some of the better mouse-oriented programs, like *Microsoft Word*, allow most functions to be executed with either a mouse or keyboard sequences, but these programs are the exceptions. In fact, most software falls resolutely into one of two categories: mouse-based software that makes the mouse intrinsic to operation and software that recognizes only keyboard commands.

For die-hard mouse fans and for others who simply want to take advantage of the quick cursor movement and easy menu selection possible with a mouse, there are two ways to overcome the restrictions of keyboard-oriented programs. Some mice, such as the popular optical mechanical Logimouse from Logitech, come with software that adds such mouse features as predefined menus and cursor movement to specific popular commercial programs like *1-2-3* and *WordStar*.

The more flexible solution is to get a mouse with a programming system that allows you to adapt any applications program for use with the mouse. Among the mice in this category are the Microsoft, Mouse Systems, and Maynard mice. These mouse programming systems allow cursor movement codes, command key sequences, and other useful commands to be grouped into menus. When everything works as expected, the combination of these user-defined mouse features with good keyboard-oriented software can approach the quality of software specifically designed for use with a mouse. In one sense, this combination can be even better, because your own preferences and styles are incorporated into the mouse interface design.

**MICROSOFT MOUSE** The language supplied with the two-button Microsoft mouse is typical of programming systems for definition of mouse interfaces. It has only 13 statements, but these 13 are surprisingly flexible and expressive. You can create a wide range of mouse menus in a variety of designs.

## ■ MOUSE INTERFACES

The MS Menu language functions like a compiler. You create a source code file containing legal statements with any word processor or text editor and then the language program compiles it. No linkage is required; the compiled menu system is loaded into memory by a separate program. Once resident, the menu remains active until the computer is reset or loses power, or until you explicitly disable it.

MS Menu programs begin with a statement that defines what the left and right buttons and a "chord" of both buttons will do, what actions should take place when the mouse is moved in any direction (normally these actions would be defined in terms of cursor-movement key combinations, but this setup allows for alternative cursor-movement schemes such as *WordStar*'s), and the sensitivity of both horizontal and vertical movement. These last ad-

justments specify how much mouse movement—measured in "mickeys" (really!) equivalent to about 1/200 of an inch—is necessary before the on-screen cursor moves. Fine tuning this sensitivity is very helpful in customizing the mouse's behavior to your preferences or the characteristics of a given program.

The language has two main mechanisms for menu display and option selection. You use the MENU-OPTION-MEND structure to create vertical menus with one option per line. The starting location and visual attribute (bold, italic, inverse video, or whatever) can be specified. A POPUP-TEXT-SELECT-PEND statement produces multiple-column menus and complex message displays anywhere on the screen.

Once you use either of these methods to display a menu, the EXECUTE and TYPE

statements do the actual work specified by the user's choice from the menu. For the most part, MS Menu does this work by typing key sequences into the keyboard buffer. In this sense, it operates very much like a keyboard macro program such as *ProKey* or *SuperKey*, but with mouse control. Combining user mouse menus with a macro program generally works well and can result in control interfaces of surprising complexity and power.

Finally, MS Menu includes a MATCH statement, which can examine the contents of the screen and take different actions depending on the contents or the visual attribute at the specified location. This is the only conditional or branching mechanism included in MS Menu, and it is useful, if limited. The MATCH statement can be used to display different menus depending on whether the host program is in editing



## FACT FILE



### PC Mouse

Mouse Systems Corp.  
2336H Walsh Ave.  
Santa Clara, CA 95051  
(408) 988-0211  
List Price: \$195

**Requires:** Standard RS-232C serial port, 11K RAM plus memory requirement of the application.

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### Maynard Mouse

Maynard Technology  
460 East Semoran Blvd.  
Casselberry, FL 32707  
(305) 331-6402  
List Price: \$285

**Requires:** One slot for interface card.

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### Microsoft Mouse

Microsoft Corp.  
10700 Northup Way  
Box 97200  
Bellevue, WA 98009  
(206) 828-8080  
(800) 426-9400

List Price: \$195 for serial version, \$175 for bus version

**Requires:** Bus version, empty slot, 64K RAM; serial version, any serial port, 64K RAM.

CIRCLE 111 ON READER SERVICE CARD

## ■ MOUSE INTERFACES

or command mode, as long as a message indicating the current mode is always displayed in the same location.

**A dBASE III MOUSE MENU** The Microsoft Mouse comes with predefined menus for 1-2-3, WordStar, and Multiplan. In order to test MS Menu's programming power, I created a mouse menu for dBASE III.

Microsoft supplies only 34 pages of documentation on MS Menu, written in the usual detailed but somewhat murky Microsoft style. For once, though, actual programming proved to be easier than expected. Anyone at all familiar with the idea of pointers as used in programming languages will have no trouble at all, and even those who haven't used this technique will take only slightly longer to catch on.

The full menu system is too long to reproduce here, but a few examples will convey the general idea. The program begins with

```
begin
mastmen,writemen,movemen,
left,right,up,down,16,40
```

a command sequence that tells MS Menu to display the master menu if the left button is pressed, a menu that controls record writing if the right button is pressed, and a movement menu that jumps around in a database if both are pressed together. It also specifies the routines to execute if the mouse is moved and reduces the mouse's sensitivity to a value I find comfortable.

The code to create the master menu pop-up box is shown in Figure 1. The POPUP command positions the pop-up box at line 2 and column 1 of the screen. An optional third parameter could have been included to specify normal or bold video instead of the default, inverse video. Since inverse video delineates a pop-up menu most clearly, it is usually the best choice.

The TEXT statements merely display the text that will appear on the menu, like a PRINT statement in BASIC. MS Menu automatically draws an outline around the pop-up menu when it's called up.

The SELECT statement specifies the routine the program will branch to if a selection is made at a given screen location; the numbers after the SELECT statement specify the routine's line and column location in the on-screen menu that's been defined, and how wide the cursor should be. Finally, the PEND statement ends the pop-up box definition.

Once the source code was written, I attempted to compile the menu system. The language's compilation itself is very fast. I made a few errors; MS Menu's limited error messages were just sufficient for me to figure out my mistakes. Shortly thereafter, my dBASE III mouse menu system worked perfectly.

The process of defining a system of nested menus was not terribly difficult once I had made the design choices. It was painless enough that I plan to design menus for several other programs I use of-

ten. The only major difficulty is that MS Menu cannot be used with programs that use high- or medium-resolution graphics. If Microsoft can't figure out how to make its mouse work with graphics programs, who can?

Microsoft has begun shipping a second-generation mouse that is dramatically superior to its first effort. The new mouse of-

---

■ **Microsoft supplies 34 pages of documentation on MS Menu, in the murky Microsoft style. For once, though, programming proved easier than expected.**

---

fers 200-steps-per-inch resolution compared with only 100 steps per inch for the original. Its shape has been redesigned to accommodate different styles of mouse use, and it is extremely comfortable to manipulate. It is also absolutely quiet, thanks to Microsoft's use of Teflon in critical areas. The annoying clatter of the first Microsoft design is completely eliminated. The new version is superior in every way.

**PC MOUSE** Although it's not as elaborate as Microsoft Menu Language, the three-button Mouse Systems PC Mouse's Pop-up Menu Definition Language is sufficiently flexible to create user-defined menus. However, you are limited to defining vertical menus with a single option per line. An extensive series of global parameters specifies how the mouse functions, including its sensitivity in both horizontal and vertical directions; a hysteresis command "smooths out" mouse movement to make it easier to create vertical or horizontal lines. Commands are included to specify keystroke sequences actuated by mouse movement, what each of its three buttons is to do, and the text and actions that are to

```
1      ----- Master Menu -----
2  mastmen: popup 2,1
3      text "----- dBASE III MASTER MENU -----"
4      text " | Cancel menu  Directories  Miscellaneous  |"
5      text " | Move Pointer  Displays    Mouse Help    |"
6      text " | Write Records  Set Toggles  Exit to DOS    |"
7      text "-----"
8      select 2,3,14
9      select 3,3,14,movemen
10     select 4,3,14,writemen
11     select 2,18,14,dirmen
12     select 3,18,14,diarmen
13     select 4,18,14,setmen
14     select 2,33,14,miscmen
15     select 3,33,14,mousehlp
16     select 4,33,14,quit
17     pend
18
```

Figure 1: A sample MS Menu program creating a mouse-activated, pop-up menu interface for dBASE III.

## ■ MOUSE INTERFACES

be included in pop-up menus.

Mouse Systems supplies a very extensive selection of predefined menus for applications, including *1-2-3*, *VisiCalc*, *Multiplan*, *SuperCalc 3*, IBM's *Personal Editor*, *WordStar*, *Volkswriter*, *PFS:WRITE*, *MultiMate*, and *dBASE II*. The menus are very well conceived and executed; the single-column vertical format isn't at all bothersome.

**SMOOTH OPERATOR** The PC Mouse worked beautifully in all my tests. It has a Microsoft Mouse emulation feature that functions perfectly with *Microsoft Word*, *AutoCAD*, and other suitable programs. The menu compiler system is more than adequate, and the pop-up menus are even better designed than Microsoft's.

The PC Mouse is an optical mouse that uses an inscribed mouse pad. It interfaces to a serial port and obtains its power from a plug-in power supply that connects to the RS-232 jack. Software drivers are provided for the Mouse Systems mode, which is the default, as well as the Microsoft Mouse emulation mode.

The mouse itself is designed for smooth and effortless operation. Its low profile dictates an extended finger style that is reasonably comfortable. But many people find the necessity for a special pad annoying and the possibility of loss or theft of the pad troublesome.

Like the older Microsoft Mouse, the Mouse Systems mouse offers 100-step-per-inch resolution. This resolution is more than adequate for almost any purpose, but somewhat more hand motion is required than with the newer, 200-step-per-inch models. Some users, however, may find that it is easier to position the pointer or cursor exactly with lower-resolution mice.

**MAYNARD MOUSE** The three-button Maynard Mouse is in some ways an even closer Microsoft clone than the PC Mouse—it has only a Microsoft emulation mode. The mouse worked fine with *Microsoft Word* and *AutoCAD* configured for a Microsoft mouse. Simple menus for *1-2-3*, *dBASE II*, *Framework*, *Personal Editor*, *WordStar 2000*, *MultiMate*, and other programs were supplied with the package and worked well.

## MOUSE HARDWARE

*The debate still rages over the relative merits of optical or mechanical mice, one-, two-, or three-button mice, and serial connection or plug-in cards.*

There are two broad classes of mouse designs, mechanical and optical. Mechanical mice use a rolling ball that rotates in response to friction as the mouse is moved over the desk surface. No special pad or other surface is needed. As it rotates, the ball contacts internal rotating parts that recognize and count this movement and pass the information along to the computer.

Optical mice move over specially inscribed reflective pads. A beam of light emitted by the mouse reflects off the lines in the pad and a sensor in the mouse tracks the reflection to determine movement. Some hybrid designs are emerging that combine the two techniques. For example, the newest Logimouse is advertised as "opto-mechanical" and is said to combine the best features of both technologies.

Mice also come in one-, two-, and three-button designs. Heated arguments have bubbled over the optimum button count, balancing ease of use against possible user confusion. The emergence of the Microsoft two-button mouse as a de facto standard has pretty much decided the issue, at least on the PC (although

three-button mice are also common). Apple's one-button mouse obviously rules the Macintosh world, but currently no single-button mice are available for the PC. Software really determines what the buttons do, and so three-button mice can easily act like two-button mice.

Another important hardware issue is how the mouse connects to the computer system. In the PC environment, two methods are widespread. The first connects the mouse to a normal RS-232 serial port. This method works well but consumes one of the only two serial ports permitted by DOS. If both serial ports are being used for other purposes, the serial connection method presents a major problem.

The second method is to interface to a plug-in card that sits on the PC's bus. This way works well and doesn't tie up a serial port, but it does consume an equally precious card slot. Some mice have been designed to be placed in series with the keyboard cable, a method that also avoids dedicating a serial port to the mouse, but there are currently no such designs available for the PC.

—Glenn Hart

Maynard includes its own system, Customkey, to define menus for other applications programs. It is more of a mouse-driven macro definition program than a language per se. You specify menus by pressing keys in the desired order and indicating a designation for the on-screen menu. You can add, change, and delete macros at the press of a button. All the various combinations of button depressions can be defined; chords of the left and center together, the two outside buttons, and every other permutation, which offers terrific flexibility, can be treated separately. This separate combination definition is a very good feature, which for some reason is not included in most three-button

mouse-control systems.

The Maynard file containing the definitions for the predefined menus looks almost exactly like a *ProKey* definition file. It is possible to edit this file with an editor or word processor, but you'll likely find this process more confusing than merely letting the Customkey program do its thing. Customkey insists that every menu you create include a choice for custom-defining the mouse buttons, another for defining menu entries, and a third for adjusting mouse parameters. These parameters include sensitivity, delay time, and repeat rate for mouse actuation, the meaning of the three mouse buttons that can be reversed for left-handers, and whether or not

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## Start with the standard

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## ■ MOUSE INTERFACES

a click should be sounded on button depression.

For the most part, the Customkey system works extremely well. Manipulating menu and button definitions is very easy; no programming knowledge is necessary. The primary trade-off for its simplicity is flexibility. No menu nesting is allowed, and so a single on-screen menu is all you can create. The number of mouse commands is thus severely limited. It also offers no way for you to position the pop-up menus on the screen; the Maynard system always uses the same locations. The pop-ups themselves are executed well, but they sometimes get in the way, covering up important areas of the screen in certain application programs.

Unlike Microsoft's two-button mouse, the Maynard Mouse uses a three-button design. On the other hand, it uses a Microsoft-like half-length, plug-in interface card and supplies only Microsoft-compatible software drivers.

**SIMPLE DESIGN** Physically, the Maynard mouse is low and slim, with only a moderate slant in the button area. It does not use a rolling ball. Instead, two tiny rollers protrude from the bottom of the unit's case, and their friction with the desktop is translated into movement commands. Since the rolling ball on other mechanical mice simply contacts similar rollers internally, the Maynard technique seems like a straightforward design that, for simplicity, removes a stage in the process. The little rollers create no cushioning or inertial effect, and I worry a bit that they might be easier to clog than other mice with surface debris and perhaps more difficult to clean. Nevertheless, I found the motion of the Maynard mouse I tested smooth and predictable.

Maynard's installation program did not work at all, but if you've had experience with Microsoft's mouse, it won't be particularly difficult for you to determine what to do. In all fairness, I should note that the

mouse I reviewed was Maynard's very first production sample; I assume that the installation process will be debugged by the time it's released. The Maynard driver can be called from AUTOEXEC.BAT or embedded in CONFIG.SYS.

**MOUSE PROLIFERATION** As the smoke from the initial battle clears, mice are being recognized as the pointing device of choice in the PC environment. Mouse manufacturers are forging ahead with more-flexible and useful products. The new generation of mouse hardware and software is markedly superior to earlier versions—the mice themselves are smoother, quieter, and offer higher resolution, and thanks to mouse programming software, they are quickly filing into the growing ranks of keyboard-oriented applications. ■

*Glenn Hart is a contributing editor of PC Magazine.*

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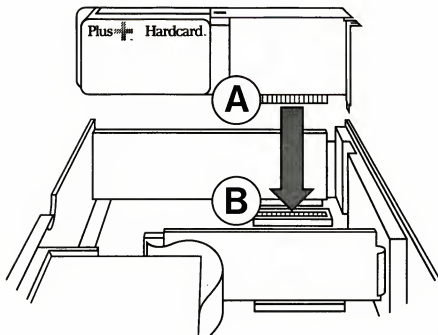


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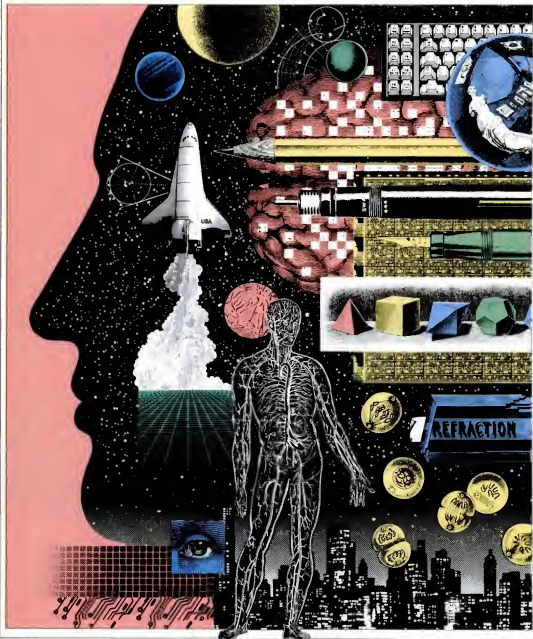
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The IBM PC liberated word processing software from the hardware and operating system constraints of earlier and smaller microcomputers. IBM's micro also removed those constraints from other applications areas, such as spreadsheets and database management systems. Perhaps most important, the PC opened new roads for creative software developers to travel.

This veritable revolution in the software industry encouraged development of word processors with new purposes and unique technologies. These new products, reviewed in this issue of *PC Magazine*, have so diverse a set of specialties that we've called

# THE BUSINESS OF WORDS SPECIAL-PURPOSE

THE PC ALLOWED SOFTWARE DEVELOPERS  
TO BUILD NEW TYPES OF PRODUCTS, AND  
SPECIAL-PURPOSE WORD PROCESSORS ARE  
AMONG THE BEST OF THE NEW BREEDS.

## ■ WORD PROCESSING

them special-purpose word processors.

Special-purpose word processors can be generally defined as products with highly specialized market niches or that meet the special requirements of advanced users or advancing operating systems technology. Four categories of special-purpose word processors were evaluated, and reviews for three of the categories (integrated programs, scientific, and special operating systems) are in this special report. The fourth category (outliners) will be covered in a future issue of *PC Magazine*.

The review procedures used for special-purpose word processors were substantially the same ones used for corporate, professional, and personal word processors (see "The Business of Words," *PC Magazine*, Volume 5 Number 2). Additional tests were made for some of these special-purpose word processing categories in order to better test their unique talents.

The chart on the next page will give you a quick guide to the products in each category by showing you its major word processing features. In addition, each product's review is accompanied by a PC Labs Expanded Fact File that contains a wealth of technical information about the product. The same mnemonics used in the special issue on word processing are used again here, and you can consult that issue to check on their definitions (see the foldout on page 95 of issue 2). Additional mnemonics for scientific word processors are defined in a special box in their review section. All of the mnemonic definitions are also available on *PC Magazine's* Interactive Reader Service.

**INTEGRATED PROGRAMS** Spreadsheets are a good example of what the newly liberated software developers could do. Spreadsheet programs designed for the PC could be larger and faster, could do graphics and more-complex calculations, and could even function as rudimentary database managers and word processors. People found an increasing variety of uses for them, and Lotus's 1-2-3, for example, became the best-selling commercial software product in history.

Computer users have a long history of always wanting more, so it wasn't a big surprise when PC spreadsheet users began clamoring for more word processing and

database capabilities in their products. Lotus, Ashton-Tate, and other software developers quickly complied by introducing a new generation of software called "integrated programs" that included stronger capabilities in those areas.



### EDITOR'S CHOICE

#### SCIENTIFIC:

*T<sup>3</sup> is at the top of the heap in PC scientific word processing. Although it requires 512K RAM and a hard disk, its consistent command structure and bit-mapped WYSIWYG graphics interface are plain hard to beat. Perhaps the best news, however, is that T<sup>3</sup> also serves as a strong state-of-the-art general-purpose word processor—a winning combination by any measure.*

#### INTEGRATED PROGRAMS:

*Framework II's word processor is easily good enough to compete with the professional products reviewed in PC Magazine's January 28 issue. It's fast and powerful, and its design provides a built-in thought and project organizer that works well. Perhaps best of all, Framework II makes integrating numeric and graphics with text a simple job. And since that's what integrated programs are all about, Framework II is a winner in its category.*

#### OPERATING SYSTEMS:

*Microsoft Windows's superior operating environment gives Microsoft Windows Write the edge in this category. It's only when you take advantage of having multiple copies of Write along with other programs on-screen at the same time that Write's appeal as a word processor begins to take hold of you—and then you won't want to let go.*

Five integrated-program word processors are reviewed here. You may find that the integrated-program word processors don't quite match the capabilities of the more senior professional or corporate products, but they are usually more than

adequate for the report writing needs of the number-oriented analysts who use them.

If your spreadsheet and database needs can be met by one of the integrated programs, then look here for one that includes a word processor that's capable of helping you do your daily wordsmithing chores.

#### SPECIAL OPERATING SYSTEMS

Integrated programs aren't everyone's cup of tea; neither is the ubiquitous—and often condemned—DOS A> prompt. Software developers are now addressing those issues simultaneously with a new generation of operating-system environments that change the way you interact with and operate programs on your PC.

The new environments offer an alternative to DOS's curmudgeonly ways by using a series of pull-down menus, dialogue boxes, and icons, all driven by a mouse-oriented interface—just like Apple's Macintosh. They also offer application integration by giving you the ability to easily move information from one application to another, and some provide the ability to concurrently load and operate more than one program.

Applications integration created by the new operating environments offers some potential advantages over the integrated-program approach. The major plus is that you can choose to run your favorite word processor, spreadsheet, or database rather than the one supplied with the package.

Two major software developers are also offering applications programs specifically designed for their new environments. Since everyone seems to need a word processor, that's one of the supplied applications for Digital Research Inc.'s *GEM* and Microsoft Windows. You don't have to use the new applications programs to use *GEM* or *Microsoft Windows*, but you may want to for some interesting and useful reasons.

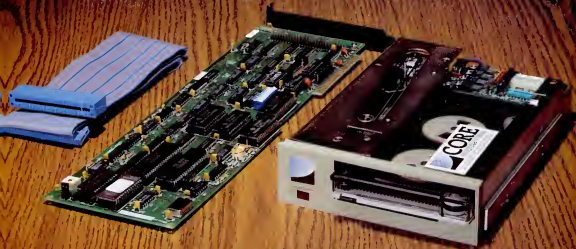
The most important reason to use the word processor supplied with an operating environment is that new software interfaces allow you to easily insert data (a graph or picture, for example) into your text. Second, the new environments operate by using a bit-mapped graphics screen interface, which can have significant advantages over traditional text-based screen technology. For example, it is possible to



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\*Infoworld Sept. 2, 1985, Page 1.



## SPECIAL PURPOSE WORD PROCESSORS

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INTEGRATED																				
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T <sup>2</sup>	\$595.00		D	K										R						
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adjust the size of your print or graphic and place it anywhere you want. That cannot be done unless the new environment is exploited to its fullest extent, and these word processors do just that.

A third reason is that these word processors offer a user interface consistent with the operating environment itself. Anyone using a variety of applications on a PC knows that the state of user interfaces among PC applications is woefully inconsistent. This new breed of software solves the problem—quite nicely if you like its style.

You can get a close look at *Microsoft*

*Windows Write* and *GEM Write* as word processors in this special report, and if you want to find out more about *GEM* and *Microsoft Windows* as operating environments, see this issue's cover story on alternative operating systems.

**SCIENTIFIC WORD PROCESSORS** Scientists and engineers may have had the first shot at using computers in their daily work, but they've often wound up with the short straw in the commercial software arena. Until recently, word processing was no exception. Only a very few products addressed the word processing

needs of people who communicate via mathematics and other special symbols.

That deficiency was originally corrected on minicomputers, and now it's happily been corrected on the IBM PC with the introduction of several scientific and technically-oriented word processing programs. Six technical writing and editing products are reviewed here. They work in graphics across multiple text lines to produce the special symbols necessary for scientific writing, and some even work with the Enhanced Graphics Adapter. If you're a technical writer, you'll surely find a winner among them.

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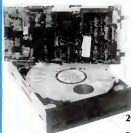
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## BRIT SCIENTEX 6.55

**D**ividing programs into personal, professional, and corporate categories doesn't mean much with scientific word processors because there aren't enough programs for the categories to be useful. Significantly, *Brit Scientex 6.55* is usable on all three levels. While it doesn't succeed in being all things to all people, it does manage to come close enough to do the job.

As a personal-level word processor, *Scientex* offers a menu-driven structure for the most often used commands. The editing screen is similar to *WordStar's*, with the top two lines devoted to status and ruler lines, and the bottom line devoted to a list of function key commands.

This similarity to *WordStar* is only screen-deep. The *Scientex* function key commands are not user-programmable. More important, they change along with the on-screen labels, depending on what you're doing.

When you enter or edit text, four of the function keys are devoted to setting and releasing left and right margin indents. Five others choose between character sets for typing (more on these shortly).

Other word processing features are a keystroke away. Hit the Esc key and the function keys change, offering such standard features as search and replace; print, adjust layout, and save without leaving the file. Choosing any of these except the last

takes you to still other menus, complete with prompts where appropriate.

The choice of single-keystroke commands for changing margins and character sets would be questionable in a general-purpose word processor, but in a scientific word processor, it makes good sense. Because scientific papers rely heavily on indented margins for setting off examples, the commands for changing margins

### A Guide to PC Labs Expanded Fact Files: Special Scientific Formatting Features

(See page 95 of January 28, 1986 issue for definitions of the abbreviations used. The following abbreviations are used only in the scientific word processor fact files.)

#### Display Strategy

- EGA = Supports EGA Graphics
- HER = Supports Hercules Graphics
- HL = Supports Half Lines
- AML = Multiline Formulas Automatically a Single Unit
- MMML = Multiline Formulas Manually a Single Unit

#### Printer Strategy

- KVF = ASCII-Based Text Fonts Used
- DFP = Downloaded Text Fonts Used
- GTP = Printer Graphics Mode Used

#### Text Entry

- TCN = Total Characters Provided
- UC = User Can Define Characters
- MCN = Maximum Characters Available
- Additional Character Strategy**
- AK = Special Characters Use Alt or Function Key
- CC = Special Characters Use Codes

should be easily available. More important, since the program is designed to type formulas, the additional character sets should also be easy to get at. And the *Scientex* approach to character sets is the best I've seen. It dovetails nicely with a WYSIWYG screen format to make formula entry as natural as possible.

*Scientex* offers five character sets: normal, italic, Greek, scientific, and extra. The first three are self-explanatory. The scientific set consists of mathematical and scientific symbols. The extra set consists of additional symbols, plus a set of small uppercase and lowercase letters suitable for superscript or subscript.

The program can toggle from any character set to any other. Even better, *Scientex* recognizes that when typing formulas, you often need only a single character from any given character set. You can switch character sets for only one letter by hitting the appropriate function key once, or you can lock the program into a new character set by hitting the function key twice.

*Scientex* also does well as a professional or corporate-level program. It's flexible enough to do just about anything you ask of it—from one-page memos to multicolored, proportionally spaced, right-justified text complete with multiline headers and footers. The program even has a sophisticated mail-merge feature that is modeled closely on MicroPro's *MailMerge*.

One significant extra in *Scientex* mail-merge is a footnote capability that offers an unusually flexible approach to footnoting. In most programs that have footnoting, the note must be typed at the point where the superscripted reference will appear in the printed text. This can get in the way of creative writing and editing, since the footnote interrupts the flow when you're reading the file off the screen.

In *Scientex* the footnote is treated as a mail-merge variable. First you enter the footnote and give it a name. Then you insert the footnote name into the text surrounded by ampersands, like this: &A&. *Scientex* puts a reference number in the text when printing and types the footnote at the bottom of the page. The program will also break a long footnote and carry it to the next page if needed.

The footnotes themselves can go anywhere in the file, as long as they come be-



## ■ WORD PROCESSING

fore the reference in the text. This means you can collect all the footnotes at the beginning of the file or in a separate merge file. And since the footnote name can be a single letter or number, it is no more distracting than the reference number will be in the final text. This approach to footnoting deserves to become an industry standard.

Another feature that ought to be widely imitated is the *Scientex* approach to inserting text. Most programs will either automatically reformat text on the screen as you type or force you to manually reformat the text when you're finished. The first approach can be distracting, while the second requires extra work. *Scientex* sidesteps both problems by waiting until you're finished inserting text, then reformatting the screen when you move the cursor past the insert point.

Two features notable for their absence are a spelling checker and a macro capability. Macros are particularly important in a scientific word processor because complex formulas or parts of formulas often need to be typed several times in a series of papers. Fortunately, these omissions are not serious because the program works well with other software.

For a spelling checker, Scientific Communications Corp. recommends *The Word Plus* from Oasis Systems. According to SCC, *The Word Plus* will spell-check normal and italic characters without problems and will ignore the Greek and scientific characters.

For macros, SCC recommends the freeware program *NewKey*. You can get *NewKey* from many bulletin boards or user groups, or you can get a copy from SCC.

Be aware that *Scientex 6.55* suffers from at least two serious problems and one troublesome design feature. The first problem is an annoying screen flicker. When inserting text, the bottom third of the line above and below the current line turns on and off. When moving the cursor, the effect spreads from the cursor up to the top and down to the bottom of the screen. This ripple effect is distracting and can contribute to eyestrain.

SCC is quick to point out that the flicker is specific to the IBM color board. There is no sign of flicker when using the Hercules graphics board with a monochrome monitor,

and according to SCC, there is no problem with the Compaq screen either. With the IBM board, however, the flicker causes enough of a problem that SCC recommends using the Hercules board instead. (The program does not work with the EGA.)

The second problem is the documentation, which is not as complete or as well indexed as it ought to be. The tutorial does not include examples of formula entry. And the command for changing text color isn't in the manual at all.

The potentially troublesome design feature is a hardware key approach to copy protection. A hardware key is about the size of a mouse and plugs into a parallel port or serial port. When you load *Scientex*, the program looks to see if the key is

there. If not, it warns you to "check security device" and will not save files to disk.

The first key that came to *PC Magazine* was for the parallel port. After not being able to make the program accept the key, I called SCC and was told that the parallel version of the key works reliably only with the IBM monochrome card. The company immediately rushed over a serial version of the key. After that, there was no further problem. Still, I can't help wondering how I would feel if I had just updated to a new computer system and found out that my old hardware key wouldn't work. (SCC will exchange the key for free in such cases.)

SCC's insistence on copy protection seems unnecessary because the program gets such solid support. Each copy of the



## EXPANDED FACT FILE

### Brit Scientex 6.55

Scientific Communications Corp.  
2136 Locust St.  
Philadelphia, PA 19103  
(215) 732-2786

Requires: 256K RAM, one disk drive, DOS 2.0 or later.

CIRCLE #71 ON READER SERVICE CARD

List Price: \$795



### FORMATTING FEATURES FOR FINAL TEXT

Paragraph Formats: JL, JR, JC, JN  
Margins: LM:0, RM:180  
Line Spacing: LS: 5-3, LF  
Character Formats: VP, PS, AP, PW, BO, IT,  
UL, SP, SB, CB  
Page Formats: LIT, LLB, GL, GR, HT, HL,  
HR, FT, FL, FR, PL:32.75, PW:15  
Tabulation Format: TL  
Header/Footer: SL, UM, AN, RN, PA, THF  
Multiple Column: TC, NC, UC, GW

### EDITING SCREEN DISPLAYS

Nontext Display: RC, CC, LN, PN  
Text Display: SL:15, SC:80, WA, WD

### TEXT ENTRY AND EDITING

Typing/Editing: FC, IT, ID, BA  
Deletion Formats: CD, WA, LE, LB  
Character Features: HH, SH, HB  
Cursor Movement: CM, CK, NC, NL, NW,  
NSC, BSC, BD, SL, SR  
Block Editing Tools: AB, MV, CP, DE, FC, PF,  
AR, HA, DF  
Search and Replace: FO, CS, CI, AS, VY  
Undo Utility: RD

### PRINTER SUPPORT

NP:13, UP, ES, EO, QU, CH, PS, OF

### FILE HANDLING

Document File Strategy: FD, DF, CT, OTH  
Document Saving: AB, MS, EN, ER, EL  
DOS Facilities: DR, MU, CDK, ADK, SDR

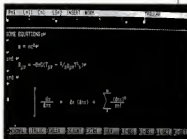
### File Import and Export: IM, IAP, EWS, BOTH

### SPECIAL FEATURES

Other: CK, CS, MM, MMD, FP, FS, FF, FL,  
SC

### SPECIAL SCIENTIFIC FEATURES

Display Strategy: HER, HL  
Printer Strategy: RTF, DTF  
Text Entry: TC:416, UC, MC:416  
Additional Character Strategy: AK



Formulas in *Scientex* are true WYSIWYG. Large symbols such as the integral sign shown here are made from smaller pieces but can be stored in a macro.

program comes installed for a specific printer and monitor card. This means that a pirated copy of the program would be useless with different equipment. Registered users, however, can get new printer drivers and such without charge, which gives a strong incentive to becoming a registered user.

All told, *Scientex* has more going for it than against it, and it is certainly a strong contender among scientific word processors. Don't plan to use it with an IBM color card, however. Include the price of the Hercules graphics card as part of the cost of using the program. —M. David Stone

## PROOFWRITER 2.27

**P**roofwriter 2.27 is tailored for the production of scientific, mathematical, and/or foreign-language documents. Its features include automatic equation and figure numbering, footnotes and endnotes, column-block moves (useful for relocating integrals and other multiline symbols), an equation macro facility that lets you "capture" text for subsequent use, and the ability to define and print non-standard characters.

With *Proofwriter*, you can define as many as six alternate keyboard layouts for a given document and switch between them at will. And if the IBM extended ASCII character set isn't sufficient for your needs, you can use the program's character-matrix editor to create your own special purpose symbols (as long as you're working at a graphics screen). *Proofwriter* prints nonstandard characters in the most efficient way it can, given your output hardware. That is, if your printer accepts downloaded character sets, *Proofwriter* will use that facility; if it doesn't, *Proofwriter* will switch to graphics mode—but only when it has to.

Each of the three "graphics" versions of *Proofwriter*—the version for the standard color/graphics adapter, the one for the EGA and equivalent devices, and the one for the Hercules Graphics Adapter—includes, at no extra charge, more than a dozen special character sets that are already "drawn." From these sets you can

pick and choose characters to make up your own alternate keyboard layouts. The most common European languages (including Russian and Greek), as well as the most commonly used mathematical, statistical, and logic symbols, are covered in these supplied characters, so many *Proofwriter* users will never need to use the matrix editor.

There's also a monochrome version of the program. To enable you to generate nonstandard characters on-screen in this version, the vendor (Image Processing Systems) offers—at extra cost—a variety of special-purpose PROMs. The pricing of the program is such that the monochrome version with one special PROM costs about the same as the CGA or Hercules version.

Unfortunately, while *Proofwriter* does a lot of things, it doesn't do them gracefully—at least not by today's standards. The program's user interface and documentation, in fact, reminded this reviewer of software he hadn't seen since the mid-CP/M-Apple II days.

For starters, before you can do any work at all in *Proofwriter*, you have to prepare a data disk or subdirectory by writing four files on it—one containing information about your screen character set, another that tells the program about your alternative keyboard layouts, and two more that are concerned with printing. What's annoying is not that you have to have all four of these files on every data disk or directory but that you have to run three separate programs (and, at least initially, wade



## EXPANDED FACT FILE

### Proofwriter 2.27

Image Processing Systems  
6409 Appalachian Way  
Madison, WI 53705  
(608) 233-5033

List Price: \$425

Requires: 256K RAM, two disk drives, DOS 2.0 or later.  
CIRCLE 638 ON READER SERVICE CARD

### FORMATTING FEATURES FOR FINAL TEXT

Paragraph Formats: JL, JC, JN  
Margins: LM:1, RM:132  
Line Spacing: LS: 5-3, LF  
Character Formats: VP, PW, BO, IT, UL, SP,  
SB, ST, CB, IBM, CT  
Page Formats: LIT, LLB, GL, GR, HT, HL,  
FB, PL, MP  
Tabulation Format: TL  
Header/Footer: SL, AN, RN, PA, THF

### EDITING SCREEN DISPLAYS

Nextest Display: CC  
Text Display: SL:24, SC:80, WA

### TEXT ENTRY AND EDITING

Typing/Editing: FC, ID, CA  
Deletion Format: CD, WE, LA, SE, SB  
Character Features: AC, HH, SH  
Cursor Movement: CM, NC, NL, NW, NP,  
NSC, BL, BP, BSC, JP, JM  
Block Editing Tools: HL, MV, CP, DE, AR,  
HA, DF, TM  
Search and Replace: FO, CS, CP, AS, VY  
Undo Utility: UD

### PRINTER SUPPORT

NP:50, UP, CH, PW, PS, OF

### FILE HANDLING

Document File Strategy: PG, DF, CT, OTH  
Document Saving: NB, AT, EN, EL  
DOS Facilities: DR, ADK, ADR  
File Import and Export: IM, IAP, EAP

### SPECIAL FEATURES

Spelling Checker: ED, IC, MM  
Other: CK, MM, FP, FE, GR, FL, SC, DV, TV,  
TM

### SPECIAL SCIENTIFIC FEATURES

Display Strategy: EGA, HER  
Printer Strategy: RTF, DTF, GTF  
Text Entry: TC:502, UC, MC:1270  
Additional Character Strategy: AK

### SCREEN CAPTURE

The following is an example of an equation which needs multiple lines:

$$\int_a^b f(x) dx = \int_a^b (a(x) + b(x)) dx$$

This equation could be entered as three lines:

Line 1:	a	b	
Line 2:	a	f(x) = (a(x) + b(x)) dx	
Line 3:	a	a	

When you get to a section of your document in which you wish to enter a specialized equation, return to the Command Level and enter an F7 key. This will insert an Equation Block into your text. Then position the cursor on the line beneath the EQL and enter the Character Mode (Char) a C. Now freely move the cursor up, down, to the right or left and enter

The top line of Proofwriter 2.27's screen is reserved for status information, but the rest of the screen is available for editing.

## ■ WORD PROCESSING

through some confusing documentation) to generate them. A single directory-configuration routine with some well-written screen prompts would do wonders to improve *Proofwriter's* first impressions.

Once you get inside *Proofwriter's* editor, you find yourself confronted with four separate operational modalities—a command mode, an insert mode, a change mode, and an append mode. It turns out

that you almost never need command mode because you can execute most of *Proofwriter's* editing commands from within insert or change (strikeover) mode—but the tutorial doesn't tell you that. And the misnamed append mode (the tutorial says it's supplied expressly for inserting entire new paragraphs within text, not at the end of a document) turns out to be entirely superfluous. The tutorial, incidentally, is simply a large file of descriptive text that you're invited to scroll through and read on-screen. You can also read it as Appendix G of the manual.

**ROUGH EDGES** Once you're past the setup and the tutorial and have figured out how to use *Proofwriter*, you have still other irritations to contend with. The function keys, for example, are implemented in an inconsistent manner—some as toggles, others not. Certain commands must be executed from command mode despite the fact that most others can be carried out from insert or change mode. If you try creating a document wider than 80 characters and you're a reasonably swift typist, you'll find characters transposed at the left side of many lines because *Proofwriter* falls behind while it's wrapping words and redrawing the screen. And if you try the spelling checker without having put the dictionary file in a place where *Proofwriter* can find it, the program will rudely plop you out to the DOS prompt—whether or not you saved your work before invoking the checker.

*Proofwriter* is copy protected; it may be installed on a hard disk once. There's no apparent way to uninstall the program, and there are no explicit warnings that a single installation is all you get.

Much—although not all—of what's wrong with *Proofwriter* has to do with matters of presentation, not of substance. The program could probably be improved by an order of magnitude or two without a drastic rewrite of program code.

As it stands right now, though, this is a program to consider only if you're hardy, patient, and have a mind for tinkering. And if you have a need for special character sets. It's definitely not something you want to hand to the secretary of the physics department who's new to word processing.—Craig Stinson

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## SPELLBINDER/ SCIENTIFIC 6.03

**T**he good news about *Spellbinder/Scientific 6.03* is that it provides the full, flexible set of graphic tools you need to display and print out a very wide variety of scientific formulas, equations, and processes. The program offers a fine selection of character sets, easily handles multiple nested subscripts, superscripts, and other positional requirements, and incorporates well-designed macro procedures that make it easy to create oversize characters—like radicals for multiline for-

mulas—and chemical schemata. The program even provides a character editor that lets you design any custom symbols you may require. The implementation on the IBM PC is reasonably good, as is the documentation/tutorial for this part of the program.

The bad news about *Spellbinder/Scientific* is that in order to use its excellent graphic capabilities you must endure the frustration of using the regular business *Spellbinder* word processing program (Version 5.4) for the nongraphics portions of your text. Moreover, should Lexisoft ever close its doors the recoverability of your scientific files will forever depend on

a single, PROLOKed key disk. That's roughly comparable to making nitroglycerin without monitoring the temperature of the reaction.

As I indicated in a previous review ("The Business of Words," *PC Magazine*, Volume 5 Number 2), *Spellbinder's* strength as a word processor lies in its flexibility. It is full-featured, and knowledgeable users can modify the program's internal tables and construct macro procedures for nearly any conceivable application. As delivered, however, the function-key implementation for the PC is not only incomplete, but involves multiple-nested operations. This means that you must carefully back up the required number of Esc key presses, or else find yourself executing search operations when all you wanted was to get back to edit mode. The program is designed to use Ctrl and Esc sequences, letter commands (such as gd for get done), dot commands, and exclamation point commands, and the tutorial/reference material is written with this in mind. Even the IBM PC supplement presumes you'll learn the program on its own terms.

While most of *Spellbinder's* command terms are mnemonic (p for print, r for read, and so on), their execution is far from self-evident. P for print, for example, doesn't begin printing at the start of the file you've been editing, but at the current cursor location (you must first hit t for top to position the cursor). Further, the default is not the whole file, but one formatted page of the file (pa prints all), and the screen display is unformatted unless you type va to view all on a separate pass. To change a margin you have to call up a "Y table" with some 16 printer parameters in it, losing sight of your text in the process. Finally, I found the 460-page manual next to impossible to read and learn from.

By contrast, for preparing those parts of your manuscript that use *Spellbinder/Scientific*, you get an excellent Quick Start manual for the IBM and a full PC-oriented tutorial/reference manual that even removes a little of the obfuscation surrounding the regular *Spellbinder* program. After you block out the number of blank lines to be treated graphically, the screen orientation becomes pure WYSIWYG. The PC's function keys are well used to permit easy switching between character sets, their po-

### EXPANDED FACT FILE



#### Spellbinder/Scientific 6.03

Lexisoft Inc.  
P.O. Box 1378  
Davis, CA 95617  
(916) 758-3630

List Price: \$695



Requires: 256K RAM, one disk drive, DOS 1.0 or later  
CIRCLE 669 ON READER SERVICE CARD

#### FORMATTING FEATURES FOR FINAL TEXT

Paragraph Formats: JL, JR, JC, JN, JM  
Margins: LM:0, RM:159, AI, AO  
Line Spacing: LS:1-3, LF, SA, KN, WC, OC  
Character Formats: VP, PS, AP, PW, BO, IT, UL, SP, SB, ST, SC, ASC  
Page Formats: LIT, LLT, LLB, GL, GR, LP:255, HT, HL, HR, FT, FB, FL, FR, MP  
Tabulation Formats: TL, TR, TD, TC  
Header/Footer: SL, UM, OF, UP, AN, RN, PA  
Multiple Columns: TC, NC, CP:2, UC, GW

#### EDITING SCREEN DISPLAYS

Normal Display: RO, CC, LN  
Text Display: SL:22, SC:80, WA, FI, ST

#### TEXT ENTRY AND EDITING

Typing/Editing: FC, IT, OD, DA, CA  
Deletion Formats: CD, WA, WE, LA, LE, SA, SE, PA, PE, PGA, PGE, DA, DE  
Character Formats: HH, SH, HB  
Cursor Movements: CM, CK, SD, NC, NL, NW, NS, NP, NSC, NPG, BL, BS, BP, BSC, BPG, BD, SU, SD, SL, SR, JC, JL, JP, JM, CK  
Block Editing Tools: HL, AB, CH, WD, LN, SE, PH, CO, CE, DO, MV, CP, DE, FC, FP, FPG, FT, AR, HA, DF, TM, HF, FN  
Search and Replace: FO, CS, CI, CP, AS, WS, WR, FS, FR, VY  
Undo Utilities: NA

#### PRINTER SUPPORT

NP:11, UP, PT, QU, CH, PW, PS, OF

#### FILE HANDLING

Document File Strategy: FD, LM, CT, ASC  
Document Saving: AB, MS, EN, ER, EL  
DOS Facilities: DR, CDK, ADK, CDR  
File Import and Export: IM, IAP, IWS, IOTH, EAL, EWS

#### SPECIAL FEATURES

Spelling Checker: WD:50000, UG, ED, IC, BG, MR, IM, AD, MM, QK  
Other: KM, CK, SF, MM, MMD, FP, FS, FE, FL, TM, HA, HS, MS, MA

#### SPECIAL SCIENTIFIC FEATURES

Display Strategy: FGA, HFR, MMI  
Printer Strategy: RTF, DTF, GTF  
Text Entry: TC:1024, UC, MC:UNLIMITED  
Additional Character Strategy AK

$$\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}$$

$$I = \frac{4\pi}{3} \frac{R_1 R_2}{1 + \frac{R_1}{R_2}} \left[ \frac{1}{2} + \frac{1}{2} \ln \frac{1 + \frac{R_1}{R_2}}{1 - \frac{R_1}{R_2}} \right]$$

Spellbinder Scientific provides a wide variety of math engineering fonts and symbols.

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## ■ WORD PROCESSING

sitions, and their attributes. While the function keys are still nested, no one expects to enter and edit formulas in multiple alphabets at 90 words a minute.

**GOOD CHARACTER** The character sets, positioning, and enhancement attributes of *Spellbinder/Scientific* are well conceived and implemented. Normal and italic alphanumeric characters as well as math symbols can all be displayed and printed either in full size or in miniature versions, and any of these can be placed either in-line or in subscript or superscript position. The Greek alphabet portion (a scientist's, not a classicist's version) of the math symbols set does not allow change of size but can be positioned on, above, or below the nominal line. Moreover, any of these character/symbol sets can be underlined, boldfaced (shadow print), and overprinted (for diacritical marks, arrows, or the like), both on-screen and (given the printer capability) on paper. Multiple attribute combinations are supported.

Additionally, two chemical keyboard sets supply the line characters and schematic combinations needed to depict processes; single, double, and triple bonds; multisided rings; and the like. While these cannot be vertically positioned like subscripts or superscripts and permit only shadow-print enhancement, the variety of vertical, horizontal, and diagonal connecting lines and symbol elements available permits proper structural display.

Two macro overlays (MEDIT for math, CEDIT for chemistry) let you construct large-size integrals, sigmas, radicals, and square and curly brackets and call up and modify chemical ring structures. Within the defined graphics area, formulas and symbols (and their parts) can be copied, moved, edited, deleted, and saved as library files for instant recall and placement. To size or position, you simply move the cursor to the corners and hit carriage returns, and if you're uncertain as to what you've defined, a keystroke draws a cute little box around it. The same macro procedure allows you to recenter a part of a numerator or denominator after you've removed one or more elements from it. (Within the defined graphics space, deletions and insertions do not cause the sudden line reformatting that a conventional

word processor would produce.)

The character editor permits you to modify or add your own characters, building them dot by dot separately for the screen and for your printer (which usually has a different resolution). While I toyed with it only long enough to see how it worked, the character editor could be a godsend for generating specialized symbols peculiar to your discipline, since with any scientific word processor you are likely to discover that its native offerings include  $n-1$  out of  $n$  needed characters.

In a world where even the PC's personality is split between color/graphics and monochrome modes, perhaps only Dr. Pangloss would expect a scientific word processor to be equally adept with graphics and text. Still, in *Spellbinder/Scientific* you have an almost clinical example of Dr. Jekyll and Mr. Hyde. The Hyde is a powerful but brutish and PC-hostile word processor; the Jekyll is an elegant and friendly scientific graphics program. You must make your own choice to live with both or neither; for myself, I seem to recall that in the end Hyde destroyed Jekyll.

—Craig L. Stark

## T<sup>3</sup> 2.1

**T**<sup>3</sup> (pronounced Tee cubed), from TCI Software Research Inc., is marketed as a scientific word processor, but it may be more accurate to think of it as a state-of-the-art program that happens to include mathematical and chemical formulas as one of its features.

This isn't to say that T<sup>3</sup> does less than it should as a scientific word processor. It just does the underlying job of word processing so well that you might consider using it even if your needs for scientific word processing are minimal or nonexistent.

In feel and function, T<sup>3</sup> is best classified as a professional-level program. It's packed with such features as macros, footnoting, automatic page formats, multiple-line headers and footers, and automatic page numbering using Arabic or Roman numerals. State-of-the-art features include bit-mapped graphics for on-screen text.

This last feature means that T<sup>3</sup> cannot be used with an IBM monochrome card.

But it also means that T<sup>3</sup> can perform such tricks as showing italics, superscripts, subscripts, and strikeouts on-screen. The display is tolerably readable with the standard IBM color card and monitor; it is positively gorgeous with the EGA.

Unfortunately, T<sup>3</sup> stops just short of being fully WYSIWYG. It does not show changes in character size, nor does it show right justification or proportional spacing on-screen. Each of these features is controlled at print time.

Commands in T<sup>3</sup> are given through a combination of pop-up menus, function keys, and the cursor keypad. The choices on the menus are usually enough to guide you to what you want to do, but there is no on-screen help—even for such basics as the commands programmed into the function keys.

A plastic 8- by 9-inch, quick-reference card partly makes up for the lack of on-screen help, but until you've thoroughly learned T<sup>3</sup>, you'll want to keep your manual handy at all times. Fortunately, the manual is well organized and thoroughly indexed.

The tutorial is also a big help. It offers a solid introduction to the program and is well worth the several hours it takes to work your way through it.

TCI points out that T<sup>3</sup> "thinks differently" from most other word processors. For example, the program does not let you start a new document by opening a file. Instead, you start with an already existing file, copy it to a new file, then revise the copy. This approach is a little confusing at first, but it has at least one important advantage.

When T<sup>3</sup> creates a new document from an old one, it copies the page format, line format, and other settings from the old document. This means that if you're creating a memo, you can start with an old memo and not have to worry about the format settings. It doesn't take long to create a stock of standard blank formats: memo, letter, manuscript, and so forth. And once you've done that, you'll rarely have to change format settings.

The concept of format files, or shell documents, works with any word processor, but T<sup>3</sup> almost forces you into using them. The T<sup>3</sup> manual even suggests a way to make format files even more efficient by

## creating user profiles

When you load T<sup>3</sup>, you have to sign on to the system. The sign-on routine includes an optional password so that each user in an office can have his or her own set of password-protected files and his or her own user profile. The user profiles let you set such things as having a tone sound along with an error message. They also let you designate a default document to start with when the program loads.

As the manual points out, you can take advantage of these defaults to create several user names, each with a different default format file. When you sign on to the program, T<sup>3</sup> will automatically load the format you need. This is the sort of trick that

will eventually occur to a sophisticated user, but by pointing it out in the manual, TCI makes life easier for the novice as well.

T<sup>3</sup> not only thinks differently from other word processing programs, it also behaves differently in some important ways. Most notable is its approach to inserting text.

In a sense, the program is always in overwrite mode. But it also has an "insert" character. This character is typed with the Ins key and shows up on screen as a vertical bar. To insert text, you first type the insert character. Anything typed after that will be inserted, unless you move the cursor off the character.



## EXPANDED FACT FILE

T21

**TCI Software Research Inc.**  
1190B Foster Rd.  
Las Cruces, NM 88001  
(800) 874-2383  
(505) 522-4600

**Requires:** 512K RAM, two disk drives, DOS 2.0 or later

**CIRCLE 470 ON READER SERVICE CARD**

List Price: \$595



#### FORMATTING FEATURES FOR FINAL TEXT

Paragraph Formats: JL, JN, JM  
 Marginal: LM:0, RM:158, AL, AO  
 Line Spacing: LS:1-12.5, LF  
 Character Formats: VP, PS, PW, BO, IT, UL,  
 SP, SB, ST, SC, CB, IBM, CT  
 Page Formats: L:1, L:T, GL, GR, LP:99, HT,  
 HL, HR, FT, FL, FR, PL:99.9, PW:99.9,  
 MP  
 Tabulation Format: LT, TR, TD, DC  
 Header/Footer: SL, UM, OF, UP, AN, RN, PA,  
 DR, T34E

Multiple Columns: NC, UC, GW

### EDITING SCREEN DISPLAYS

Text Displays: SL: t6, SC: 80, WA

## TEXT ENTRY AND EDITING

**Typing/Editing:** FC, OD, CA  
**Deletion Formats:** CD, WE, WB, LE, LB, SE,  
 SB, PE, PB, DE, DB  
**Character Features:** HH, SH, HB  
**Cursor Movement:** CM, CK, NC, NL, NW, NS,  
 NP, NSC, BL, BS, BP, BSC, BD, SL, SR,  
 JC, JM  
**Block Editing Tools:** HL, AB, CH, WD, SE,  
 PH, CE, BC, MV, CP, DE, FC, AR  
**Search/Replace:** FO, CS, CI, AS, FS, FR, VY  
 Undo Utility: RD

## PRINTER SUPPORT

NP:43, UP, PS, OF

## FILE HANDLING

Document File Strategy: LM, DF, CI, OTH  
Document Saving: AB, MS, EN, ER, EA, EI

## DOS Facilities: DR, MU, CDK, ADK, CDR.

ADR

**File Import and Export: IM, LAP, EAL**

**SPECIAL FEATURES**  
Others: KM, CK, SF, FP, FS, FF, FL, SC, DV,  
TM, HS, MU

### SPECIAL SCIENTIFIC FEATURES

**Display Strategy:** EGA, HER, HL, AML  
**Printer Strategy:** RTF, DTF, GTF  
**Text Entry:** TC-400, UC, MC-1028  
**Additional Character Strategy:** AK



<sup>†</sup> *T<sup>3</sup> relies heavily on a WYSIWYG screen to show print enhancements and special characters for mathematical and chemical formulas.*

## ■ WORD PROCESSING

T<sup>3</sup> permits only one insert character on the screen at a time, but once typed, the character will stay in place until deleted or until you create an insert character elsewhere. This means that you can move the cursor away from the insert character and then come back to it.

All this takes a little getting used to, particularly if you prefer to leave your word processor in insert mode, as I do. But at the very least, this approach works better than most variations on drop-down insert.

T<sup>3</sup> has other "standard" features worth mentioning, such as tab stops that can use left, right, centered, or user-definable decimal tabs. But its central feature is its mathematical and chemical formulas.

There are two considerations in typing formulas: You have to be able to type the characters you need, and you have to put each character in the right place on the page.

T<sup>3</sup> solves the first problem by making over 900 characters available through a series of predefined keyboards (including chemistry, forms, italics, Cyrillic, math, script, IBM symbol, and "same as keys"). You can also define additional characters and either modify the existing keyboards or create new ones.

T<sup>3</sup> gives immediate access to any two keyboards. Normally, one of these will be the standard keyboard. The other, or alternate, will be whichever keyboard is most useful for the task at hand. The program also lets you select other keyboards when needed. The Alt key serves as a Shift key for calling on the alternate layout, while Alt-F1 serves as a Shift lock.

Positioning the text is almost trivial in T<sup>3</sup>. The PgUp and PgDn keys also function as half-line up and half-line down keys and can automatically create a half-line space if one doesn't exist. This makes it easy to create a fraction that is vertically centered in a line.

Another nice touch is that T<sup>3</sup> treats all the half-lines in a given formula as a single line. Put the cursor anywhere in front of a formula, insert text or spaces, and the entire formula moves as a unit. Similarly, you can delete an entire column within a formula with a single keystroke rather than having to delete a character on each half-line.

Also worth mentioning is that a "chemistry library" is available for \$30. This contains 138 macros designed specifically for creating chemical formulas and includes such biochemical basics as the amino acids.

Balanced against all the good points of T<sup>3</sup> are a few minor problems.

---

■ T<sup>3</sup> does the underlying job of word processing so well that you might use it even if your need for scientific word processing is minimal.

---

To begin with, this program is big. On a floppy-based machine, it needs four disks and entirely too much disk swapping. TCI recommends using a hard disk, on which the program eats up 680K. It also needs 512K RAM, and even then it has to create spill files on-disk to hold the overflow from a four-page document.

There are also several features that the program doesn't have, but should. Most important, there is no spelling checker and no way to use T<sup>3</sup> data files with anyone else's spelling checker. Also missing are mail-merge, text columns, automatic indexing, automatic table-of-contents generation, and a true undo feature for recovering from an accidental deletion of text. And if you insist on using color, be aware that the only way to add color to T<sup>3</sup> is with Debug.

A particularly troublesome problem for me is that T<sup>3</sup> does not dynamically repaginate. If you like to keep track of how much you've written, you'll find yourself continually repaginating to check on your progress. In writing this review, I created a macro that speeds up repagination, but I still feel lost without a line count for the current page.

Finally, as with other scientific word processors, T<sup>3</sup>'s printer requirements are highly specific. TCI has 24 printer drivers

that support a total of 43 printers. The program comes with one driver of your choice. Additional drivers cost \$60 each for daisy wheel, thimble, and dot matrix printers, or \$95 each for laser printers.

To T<sup>3</sup>'s credit, none of these problems is a fatal flaw unless you absolutely must have one or more of the missing features. In fact, the list is notable for the lack of any truly serious problems. And if you have a hard-disk machine, T<sup>3</sup> may well be your scientific word processor of choice.

—M. David Stone

## TECHWRITER 2.11 (MS-DOS Version)

**T**echWriter 2.11 (MS-DOS Version) is a full-featured word processor with a 120,000-word dictionary and automatic table of contents and index generation that provides special support for scientific applications: an on-screen display of 282 scientific and mathematical characters in a variety of fonts and sizes, a special mode for formatting equations, and a microspaced printing capability. TechWriter sports a front-end menu structure modeled on MultiMate (the document and disk management utilities are very similar) and, like that program, is largely function-key oriented.

TechWriter features a WYSIWYG bit-mapped display that can be driven by a regular IBM color/graphics adapter or a Hercules monochrome display adapter for monochrome aficionados. However, it's wise to base your choice of screens on resolution, not color; although you can configure the program on a color monitor, you can display only one color at a time. According to Computer Mart Inc., support for the EGA should be available by the time you read this, but since the EGA imposes its own overhead and TechWriter is already slowed by the demands of maintaining a bit-mapped display, you should be wary of using the EGA with anything but an 80286-based machine.

TechWriter, like most scientific word processors, is no speed demon. Its screen constantly plays catch-up during heavy



## ■ WORD PROCESSING

editing sessions, while its commands are slowed by the program's frequent need to read glossaries from the disk. Even such a common operation as deleting a block takes about 7 seconds to complete on a PC-XT (for this reason, consider a hard disk mandatory to obtain reasonable performance from *TechWriter*). *TechWriter* also frequently employs two-step combinations for its commands, a keystroke longer than in other programs. For example, to create a footer you must press the "begin" keys (Alt-1) followed by the "footer" keys (Alt-3), and then terminate with the "end" (Alt-2) and "footer" keys.

To avoid continually refreshing the

screen, the program sometimes postpones screen response until an entire series of commands is completed. You must therefore be careful with such things as holding down the Del key; although only one character disappears initially, a couple of moments after you release it, an entire sentence may suddenly evaporate.

**COMMAND DESIGN** *TechWriter* operates through extensive use of alphanumeric function keys occasionally augmented by menus and prompts. Those keys not used for program functions work overtime by supporting up to six special characters in addition to the normal alpha-

numeric IBM designates. *TechWriter* accomplishes its magic by completely redefining the keyboard, so even the Shift-PrtSc combination no longer prints a copy of the screen image—it reverses transposed characters, which is a function I grew to love [click] love. When you need to use functions such as print screen or perform a warm reboot (Ctrl-Alt-Del), you can toggle the keyboard to a more PC-like mode using the Ctrl-Alt-ScrollLock keys to do so.

Like any program that relies on extensive use of function keys, it takes some time to acclimate yourself to this one; but *TechWriter's* unusual remapping of the keyboard aggravates this problem for program novices. Even such standard IBM keys as Esc have had their normal functions reassigned: the Ins key functions as the Esc key; toggling between insert and overstrike is one of the functions delegated to the FIO key; the Del key is the help key; and the Shift-Backspace assumes the Del key's normal function.

If CMI has presented you with a somewhat unorthodox program to learn, it has at least provided good learning materials to help you accomplish the task. The program comes with two loose-leaf notebooks: one is a comprehensive (but unindexed) reference manual; the other, a collection of an installation guide and two training courses (there is no on-disk tutorial included).

Also offsetting its drawback is the wide range of functions available with *TechWriter*. Mail-merge can be performed from another *TechWriter* file or the key board. Footnotes are available and can span more than one page, differing headers and footers can be placed on alternate pages, and page numbers can be designated in roman or arabic numbers or in letters (uppercase or lowercase). One function key toggles the screen between partially formatted, fully formatted, and unformatted modes. In the unformatted mode, you can see each of the formatting codes embedded in the document, and operations such as search and replace become sensitive to them. You can use a menu-driven approach to formatting or use the "Setfm" (set format) command to enter format commands directly. Printed vertical line spacing can be set in increments of  $\frac{1}{32}$  of



**PC  
LABS**

# EXPANDED FACT FILE



**TechWriter 2.11**

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1395 Main St  
Waltham, MA 02154  
(617) 899-7244

List Price: \$595

**Requires:** 256K RAM, two disk drives, DOS 2.0 or later.

**CIRCLE 640 ON READER SERVICE CARD**

## FORMATTING FEATURES FOR FINAL TEXT

Paragraph Formats: JL, JR, JC, JN, JM  
 Margins: LM:0, RM:126, AL  
 Line Spacing: LS:1-63, LF  
 Character Formats: VP, PS, PW, BO, IT, UL,  
 SP, SB, ST, SC, CB, ASC  
 Page Formats: LIT, LLB, GL, GR, LP:127,  
 HT, HL, HR, FB, FL, FR, PL:127,  
 PW:126, MP  
 Tabulation Formats: TL, TR, TD, TC, FC  
 Header/Footer: SL, UM, OF, AN, RN, PA,  
 PR, PO, THF  
 Multiple Columns: TC

### EDITING SCREEN DISPLAYS

**Nontext Display:** R.O, D.F, DK  
**Text Display:** SL,20, SC,78, WA, FJ  
**TEXT ENTRY AND EDITING**  
**Typing/Editing:** FC, IT, ID, CA  
**Deletion Formats:** CD, WA, LA, SA, PA  
**Character Functions:** HH, SH, HB  
**Cursor Movements:** CM, NC, NL, NW, NS, NP,  
 NSC, NPG, BL, BSC, BPG, BD, SU, SD,  
 SL, SR, JC, JP  
**Block Editing Tools:** HL, AB, MV, CP, DE,  
 AR, HA, DF, TM, HF, FN  
**Search and Replace:** FO, BK, BS, CL, CP, WW,  
 AS, WS, WR, FS, FR, VY  
**Undo/Find:** LD

**PRINTER SUPPORT**

NP:13, SP:1, ES, EO, CH, PS, OF, AE

## FILE HANDLING

**Document File Strategy LM, PG, DF, OTH,**  
**DS:255 PAGES**  
**Document Savings: NB, MS, EA, PL**  
**DOS Facilities DR, CDK, ADK, SDR**  
**File Import and Export: IM, IAP, EAP**

### SPECIAL FEATURES

**Spelling Checker:** WD, I20000, UG, UD, US, ED, IC, AD, QK, QL  
**Other:** KM, CS, MM, MMD, FP, FS, FE, AJ, AT, GR, SC, DV, TM, HD, HA, MS

### SPECIAL SCIENTIFIC FEATURES

Display Strategy: HER  
Printer Strategy: RTF, DTF, GTF  
Text Entry: TC:376, MC:376  
Additional Character Strategy: AK, CC

```

Dennis      Makayla Washington Cat 5.0  Lines: 50      Page: 8      E:\DEV\01-200
Then she started to get surprised baby, with comments like:

    4      
$$\frac{dx}{dt} = x \ln(x) + \frac{1}{x} \quad \frac{dy}{dt} = y \ln(y) + \frac{1}{y}$$

    4
    4      
$$dx = x \ln(x) + \frac{1}{x} \quad dy = y \ln(y) + \frac{1}{y}$$

    4
    4      
$$\frac{dx}{dy} = \frac{x \ln(x) + \frac{1}{x}}{y \ln(y) + \frac{1}{y}}$$

    4
    4      After some things got too complicated, so I stopped trying
    4      to follow what she was doing.

```

Formulas and equations appear in TechWriter on the screen almost as they will on paper. Note the reduced size of subscripted numerals in the formula mid-screen.

## It's 8am, Do You Know Where Your Programs Are?

TOC Business Solutions, Inc.  
Table of Contents

Day Saturday  
Date 12-27-1985  
Time 05:22:10pm

Menu: MAIN

- Unlimited Sub-menus
- Password Protection
- Parameter Passing
- Custom Colors
- Custom Title

Languages	F1
Symbolset	F2
Word Processing	F3
Database Management	F4
Communications	F5
Graphics	F6
Games	F7
Assorted Utilities	F8
DOS Utilities	F9
Exit	F10

FAST!  
EASY!

Left Scroll	ROOT DIRECTORY	Right Scroll
AUTOCHECK.DAT	CONFIG.SYS	COMMON.COM
BASIC1 (DIR)	DATABASE (DIR)	GAMES (DIR)
MAIL (DIR)	NETWORK (DIR)	PASCAL (DIR)
UTILITY (DIR)	TOC (DIR)	AGSTAR (DIR)
		GENE.DAT
		DOS (DIR)
		PRINTOUT (DIR)
		WORDPROC (DIR)
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CIRCLE 105 ON READER SERVICE CARD

## ■ WORD PROCESSING

an inch, while  $\frac{1}{120}$  of an inch increments are available for horizontal spacing.

*TechWriter's* formatting commands are limited by its inability to specify blocks for formatting; when a formatting command takes effect, it does so until explicitly countered by another command. Strangely, although *TechWriter* keeps more than one page in memory at a time, a change to a format command will change the display of only the current page until you invoke the repaginate function.

**SCIENCE, MATH, AND MAGIC** *TechWriter* allows you to enter single-line equations in the context of normal typing or multiline equations in a user-defined "equation block." The program generates scientific and mathematical characters when you type a standard alphanumeric character followed by one to three presses of a function key (*TechWriter* comes with a keyboard template showing the correspondence between keys and special characters), or you can set the character mode to one of the alternative character sets and type them directly.

You enter multiline equations in an equation block consisting of the lines of your choosing. Each line of the screen within the block represents one-half of a printed line, and the entire block will remain on the same page (provided the block is less than the current page-length setting). Special formats allow numerals to be reduced in size (for superscripting and subscripting), whereas sigmas, integrals, and several other symbols may be enlarged to encompass several lines. Producing enlarged characters requires you to precede the normal keystrokes with the glossary key, whereupon *TechWriter* prompts you for the height you desire (and in the case of a sigma, width as well). *TechWriter* displays most reduced or enlarged characters just as they will be printed.

The act of defining an equation block automatically places *TechWriter* in math mode. This mode does not allow for the deletion of spaces; if you delete a character of the formula, *TechWriter* replaces the characters with a blank space. Normal deletion activity resumes when you terminate this mode. However, in no case is there a dynamic link between the different lines of the same formula. Therefore, if you delete

characters on one line, you must manually reposition all characters on the lines above and below to reestablish their relative locations.

*TechWriter* prints your choice of downloadable character sets (often used in concert with any proprietary character set your printer may contain) or graphics. The option reflects a tradeoff between speed and resolution. If you need only a draft print-out, select a downloadable character set and your printer will print it with roughly the same speed as it prints in its own character set. For example, the Epson FX-85 used its enhanced mode, which operates at about one-half to one-quarter of that printer's maximum speed. *TechWriter* will use downloaded characters (or characters it constructs from them) to fill in any scientific or mathematical characters unavailable in the printer's character set. However, in the case of the FX-85, the downloaded characters were of much lower resolution than the printer's characters.

To achieve uniformly high resolution for final copy, you must select an Epson graphics driver. Since you make a great sacrifice of speed in doing so (unless you are using a laser printer—*TechWriter* supports the HP Laserjet and is working on drivers for the Laserjet Plus and the Canon Laser Beam), the low-resolution option is a valuable addition. Recognizing the bottleneck created by printing, *TechWriter* provides several additional tools to help: You can print and edit the same document simultaneously, use a handy utility to print documents without *TechWriter* (enabling you to print on one computer while editing and printing on another), or chain documents for printing (this is not the same as a queue; the format commands of the first document affect all others).

If your idea of the ideal scientific word processor is one that measures up to the exacting performance standards placed on professional word processors—with added support for scientific tasks—you'll find *TechWriter*'s leisurely pace disappointing. On the other hand, if you prefer to be known for the lightning you produce in the laboratory, not at the keyboard, then *TechWriter*'s breadth of word processing features and support for special characters may earn it a line on your next requisition. —Dick Ridington

## VOLKSWRITER SCIENTIFIC 1.0

**I**f 100 percent WYSIWYG design and precise control of text placement are what you want most in your scientific word processing, then *Volkswriter Scientific 1.0* may be the program for you.

*Volkswriter Scientific* is one of the few word processors that ignores the standard ROM-based text fonts at both screen and printer. Instead, it creates its own text font by using the IBM high-resolution graphics on-screen and graphics mode at the printer. It's also the first word processor I've seen that offers manual control over micro-space justification, literally on a pixel-by-pixel basis.

Together, these two features let the pro-

gram show everything on-screen just as it will appear when printed—complete with boldface, underlining, italic, superscripts, subscripts, and true proportional spacing. This is in sharp contrast to most programs, which show print enhancements as different colors or even as embedded print commands.

Because *Volkswriter Scientific* uses the IBM high-resolution graphics mode, it is limited to a single color on a black background, but at least it gives you a choice of color. And it seems a small price to pay for true WYSIWYG.

The program even has two font sizes, so that you can enter section titles in large type and see them that way on the screen. And, of course, it has a stock of scientific characters—the Greek alphabet, mathematical and engineering symbols, and various building-block characters for con-



### EXPANDED FACT FILE

#### Volkswriter Scientific 1.0

Lifetree Software Inc.  
4111 Pacific St  
Menlo Park, CA 94040  
(408) 373-4718

List Price: \$495



Requires: 256K RAM, two disk drives, DOS 2.0 or later.

CIRCLE 668 ON READER SERVICE CARD

#### FORMATTING FEATURES FOR FINAL TEXT

Paragraph Formats: JL, JM  
Margins: LM:0, RM:80  
Line Spacing: LS: 5-3, LF  
Character Formats: PS, PW, BO, IT, UL, SP, SB, CB  
Page Formats: LIT, LLT, LP:67, PL:99.9, PW:8

#### EDITING SCREEN DISPLAYS

Nextest Display: CC, LN, PN, DF  
Text Display: SL:16, WA, FI

#### TEXT ENTRY AND EDITING

Typing/Editing: FC, IT, ID, IM  
Deletion Formats: CD, LA, LE, PGE  
Character Features: HH, SH, HB  
Cursor Movements: CM, CK, NC, NL, NSC, NPG, BL, BSC, BPG, BD, JP  
Undo Utility: UD

#### PRINTER SUPPORT

NP:35, PS

#### FILE HANDLING

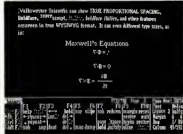
Document File Strategy: LM, PG, DF, OTH, DS:99 Pages  
Document Saving: NB, EA, PL  
DOS Facilities: DR, MU, ADK, SDR  
File Import and Export: IM, IAL, IOTH, NEA

#### SPECIAL FEATURES

Other: KM, CS, SC, HS

#### SPECIAL SCIENTIFIC FEATURES

Display Strategy: EGA, HL, AML  
Printer Strategy: GTF  
Text Entry: TC:400, MC:400  
Additional Character Strategy: CC



*Volkswriter Scientific* is virtually 100 percent WYSIWYG, relying on bit-mapped graphics to produce print enhancements.

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Portland, OR 97219

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CIRCLE 156 ON READER SERVICE CARD

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CIRCLE 519 ON READER SERVICE CARD

PC MAGAZINE ■ FEBRUARY 23, 1986

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## ■ WORD PROCESSING

structing chemical symbols.

Formula entry in *Volkswriter Scientific* is straightforward. The special symbols are all typed with two characters. These always begin with either a backslash or a "reverse quote" ('), so the Greek letter alpha, for example, is entered as '\a', while the cent sign (¢) is entered as 'S. The characters are grouped into five categories and are listed in help screens that can be called up at any time on the bottom fourth of the screen. The program's manual control over microjustification is also more than a little helpful in setting up formulas to look exactly the way you want them.

**LIMITATIONS** Unfortunately, *Volkswriter Scientific* has some serious limitations as a word processor—so much so that it might better be thought of as an add-on utility for use with some other, more flexible program.

Word processing should make it easy for you to change your mind—both about what you're typing and how you want it to look. The *PC Magazine* word processing script tests this underlying function thoroughly, and in our tests *Volkswriter Scientific* came up short.

First, the program has no search feature, much less search and replace. To complicate matters further, it is page oriented and automatically repaginates when you move from one page to the next. If you've deleted two lines of text from page 1, the first two lines from page 2 will be shifted back when you move to page 2, and you'll never see them unless you go through the page a second time.

The program also fails to offer an easy way to modify margins because of the way it stores the margin information with the text. According to Lifetree Software Inc., it is possible to change the margins, but this involves laboriously changing one line at a time. In any case, the trick is not described in the documentation, and Lifetree suggests that for most purposes it's quicker and easier to retype the text using the new margins.

Even something as basic as moving the cursor from one line to the next while editing is unusually clumsy with *Volkswriter Scientific*. If you use the cursor movement keys, the cursor moves in half-lines; this is important for entering formulas because it



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## ■ WORD PROCESSING

lets you center a fraction vertically within a line. Unfortunately, the text lines can be separated by anything from two half-lines (single spaced) to six half-lines (triple spaced), which means you have to hit a cursor key anywhere from two to six times to move from one line to the next.

Lifetree's use of the Return key partially solves this problem by moving the cursor to the beginning of the next line without inserting a carriage return. But this works only in one direction, and it eliminates the usual function of the Return key. If you want to type a carriage return, you have to use either the Esc key or a Ctrl-Return combination.

One other feature notable for its absence is a true tabbing capability. Except when creating paragraph indents on a blank line, the Tab key functions as a cursor movement key—moving without inserting spaces in the text. The program also doesn't have tab stops for columnar entry. You have to space over to the columns, then enter the text or numbers.

**BETTER AS AN ADD-ON** All this and more makes *Volkswriter Scientific* a poor choice for creative writing and editing. As I've already suggested, the best way to use the program is as an add-on utility to some other word processor. The obvious choice is *Volkswriter Deluxe*, which shares many of its commands and format control codes with *Volkswriter Scientific*. But any program that produces ASCII files will do.

The trick is to do all your creative writing and basic formatting on your primary word processor, then import the file into *Volkswriter Scientific* and add the formulas and other finishing touches. In effect, you wind up using the program as a poor man's typesetting device.

Finally, be aware that because of this program's approach to text as graphics, it will work only with the IBM color card or an exact equivalent. The seven printer drivers have been tested with a total of 35 different printers.

Despite its limitations, *Volkswriter Scientific* offers more precise control over the final printed output than any other word processor I've seen. And on that basis alone, it may well be worth a look.

—M. David Stone

THE BUSINESS  
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# INTEGRATED PROGRAMS

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MORE CAPABILITIES, THE MARKET  
RESPONDED WITH PRODUCTS THAT  
INCLUDED WORD PROCESSORS.

## ELECTRIC DESK 1.04

If computer programs are like sound systems, then *Electric Desk 1.04* is a compact stereo. Someone once said that there are two kinds of people in this world: those who divide everything into two categories and those who don't. Well, I divide people into those who prefer compact systems and those who prefer separate components. Compacts are easier to buy; you get everything you need in one box, and usually for less. Component systems are harder to select and operate but produce more-sophisticated results.

Like a compact stereo, *Electric Desk* does it all: word processing, database management, spreadsheeting, and even communications. The program displays all these facilities in similar ways, and a number of function keys perform common commands no matter which facility you use. It crams all these capabilities into a package that costs less than most high-powered word processors.

Unfortunately, *Electric Desk* suffers from the same handicap as its stereo relatives. It fails to deliver outstanding performance in any area. It does most of what you might want it to do quickly enough and without being too difficult to learn, but many people may find it constricting.

Many of the standard features are avail-

able. You can perform block moves, deletions, and copies with relative ease. The blocks may be saved to disk as you work with them, so it becomes a simple matter to create and recall boilerplate text. It has a fairly comprehensive set of cursor controls, although some are not intuitively easy to use. For example, you must press the End key twice followed by a cursor key to move to the beginning or end of the document.

*Electric Desk* has a search-and-replace function, but it is case-sensitive and can only work forward through the document. You cannot search for carriage returns or spaces or use wildcards. These are small details that don't matter until you need them, and then they make a big difference in how you feel about your program.

The merge function works easily, making good use of the database management portion of the package. Unfortunately, if you are using the system to write form letters and want the pages numbered, you can't reset the page number to 1 or change the header at the start of each letter. Consequently you must either merge each letter one at a time (requiring operator intervention for each merge) or give up the page numbers.

Although you can define tabs on the ruler line, *Electric Desk* gives you only one ruler per document. Changing the ruler affects the entire document and refor-

mats any text to the new tabs. You must either set up the tabs at the start of the document or set up a separate document with different tabs and then "include" it in the main document. You cannot tab to indent a paragraph since that indents the entire block of text (it's more like a temporary left margin), so you have to either manually enter the spaces or set up a macro key to do the job. The absence of decimal tabs is also a shortcoming, but you can easily create and include spreadsheet tables.

The documentation is adequate, but barely. The advanced word processing features are buried at the back behind the tab for the telecommunications module. The index is fairly complete, but the manual itself is poorly organized into a mix of tutorial and reference material that does not succeed at either.

The on-disk tutorial is presented as an "interactive" system, and this term is accurate in that the system prompts you for the proper keystrokes and lets you select the module you wish to cover. Unfortunately, all the tutorial program does is count keystrokes, so you get no feedback about whether you have pressed the correct keys or not. (How much help is a tutorial that accepts a Win in place of Ctrl-C?)

There are some aspects of *Electric Desk* that I liked. It does a good job of integrating the different modules. Switching back and forth among different tasks is easy, and you can have (memory permitting) nine documents open at once, plus spreadsheets, databases, and communications sessions. It's a snap to copy text from a database or spreadsheet to a document—another real advantage. And although *Electric Desk* doesn't offer the interactive links between tasks that more complex integrated packages like *Framework* give you, its degree of integration may be enough for many people.

*Electric Desk* is fast and responsive. It makes intelligent use of the IBM key-board, and its on-screen menus make it fairly easy to learn. It is a little too easy to erase your file without saving it (you don't get a warning), but if you're careful, that problem is manageable. It formats your text as it is entered, so you don't have to bother with annoying reformat or repaginate commands.

Alpha Software is working on Version



## ■ WORD PROCESSING

1.1, which is in the beta-test stage as I write and is scheduled for release by the time this article is published. The new version will double the maximum size of a document to 64K, add some additional word processing commands and features, and remove the key-disk copy-protection scheme.

If you are looking for a serviceable word processor along with the other productivity standbys, *Electric Desk* may be for you. Be sure to evaluate your needs carefully, however, so that the program won't drive you up the wall when you come up against some of its limitations.

—Alfred Poor

## ENABLE 1.1

**I** love gadgets that can be used for many purposes, but I am not crazy about things that are complicated to learn and use. Perhaps that's why I am firmly "undecided" when it comes to my feelings about *Enable 1.1*.

There is a lot to love in *Enable*. As a word processor, it holds its own fairly well against most of the competition, including independent word processing packages. It has plenty of formatting options and can handle the more exotic tasks like tables of contents, footnotes, and indented indexes. It has "paper clips" (text markers) and comment lines, and you can insert new tab rulers whenever you wish. You can quickly shift from draft to final format display, to preview where the page breaks will occur and other details.

*Enable* gives you a graphics display of your text, so that you can see boldfaced, underlined, and italic text as it will appear on the printed page. The program also makes it easy to access the higher-order characters of the IBM display, so that you can include foreign characters or line graphics (not all printers can print these properly, however). It is a windowing program, so that you can have multiple views of a file or multiple files tiled across your display, and you can quickly cut and paste between windows.

As an integrated package, *Enable* also gives you a database management module

(complete with a procedural language), spreadsheet, graphics, and telecommunications. At the head of all these programs is a master control module that controls windows, file management, macros, and more. You can use it to create reports that combine text, spreadsheets, and graphics by doing little more than a block cut-and-paste operation. You can even use the database language to define conditional logic in mail-merge applications, so that you can have different paragraphs print for different people, depending on what is in their merge records. (Incidentally, in spite of the company's claim that *Enable* runs fine on floppy disks, I strongly recommend a hard disk to avoid the "floppy shuffle.")

Any program that does all this is, by definition, somewhat difficult to learn. To its developers' credit, *Enable* goes a long way to make things easier for you. There are two modes of operation within the pro-

gram. First, you can press the F10 function key to see a 1-2-3-like menu of choices across the top of the screen. After you select one, a pull-down menu often appears, giving you more numbered options. As with most menu-driven approaches, this means it can take a long time to get where you want to go.

**COMPLEX COMMANDS** Fortunately, *Enable* also has an "expert" mode that reduces the menu choices to a series of command keys, triggered by the F9 function key. The bad news is that the program has nearly 100 expert commands (in addition to the 20 function key commands and miscellaneous cursor control commands), and many require up to four keystrokes. *Enable* tries to offer help by prompting with a cryptic list of the alphabetic choices at the bottom of the screen. The help option (accessed by the F1 function key) is also pre-



**Electric Desk 1.04**  
Alpha Software Corp.  
3030 St.  
Burlington, MA 01803  
(800) 451-1018  
(617) 229-2924

**EXPANDED FACT FILE**

Requires: 256K RAM, one disk drive, DOS 2.0 or later.  
CIRCLE 662 ON READER SERVICE CARD

List Price: \$345



### FORMATTING FEATURES FOR FINAL TEXT

Paragraph Formats: JL, JC, JN  
Margins: LM:1, RM:80  
Line Spacing: LS:3, SB, SA, KN  
Character Formats: PW, BO, IT, UL, SP, SB, ST, SC, CB, ASC  
Page Formats: LIT, LLB, GL, GR, LP:99, HT, HL, HR, FL, FR, PL:99, PW:132, MP  
Tabulation Format: TR  
Header/Footer: SL, UM, OF, UP, AN, RN, PA

### EDITING SCREEN DISPLAYS

Nonprint Display: RC, CC, LN, PN, DR  
Text Display: SL:22, SC:80, WA

### TEXT ENTRY AND EDITING

Typing/Editing: FC, IT, ID, CA  
Deletion Formats: CD  
Character Features: AC  
Cursor Movements: CM, CK, NW, NSC, BL, BSC, BD  
Block Editing Tools: HL, CH, WD, LN, CE, DO, MV, CP, DE, AR, HA, DF, AW, HF  
Search and Replace: FO, AS, FS, FR, VY  
Undo Utility: NA

### PRINTER SUPPORT

NP:120, UP, PT, ES, EO, QU, CH, PS

### FILE HANDLING

Document File Strategy: FD, DF, ASC, DS:32 KBYTES

Document Saving: MS, EN, ER, EL  
DOS Facilities: DR, MU, ADK, ADR  
File Import and Export: IM, IAP, EAL

### SPECIAL FEATURES

Other: KM, CS, MM, MMD, DV, TM



*Electric Desk* has a collection of context-sensitive help screens that can be called up with function keys.

sent, but instead of a context-sensitive screen, you simply get the general word processing topic index. As a result, you will want to keep the quick-reference guide handy for quite a while as you learn the program.

If complex commands were the only drawback, I would probably be more enthusiastic about the product. As it turns out, however, it suffers from a few rough edges.

The first snafu occurred when I tried to search for and delete the words *Chapter 1*, *Chapter 2*, and so on. I used a search with a wildcard for the digits and tried to replace them with a null string—and the computer seized up like a car with a frozen engine block. It took some

time to diagnose the problem, but apparently *Enable* searches for letters but not numbers, and the wildcards for digits were giving it trouble.

Other problems I encountered included decimal tabs that did not work properly and line spacing commands that did not take effect until one line after they were supposed to. Representatives of The Software Group assured me that these problems have been fixed in the more recent releases of Version 1.1, but you may want to check this out for yourself.

In addition to the bugs, *Enable* puts me off simply by its philosophy of design. Most word processors favor inserting text over overstrike mode or are, at

least, indifferent to the distinction. *Enable* is one of the few programs I have encountered that clearly expects you to work in overstrike mode. For example, the Backspace key replaces the character over the cursor with a space and then moves the cursor one space to the left. You are now ready to overstrike the incorrect previous letter, but the Backspace key has really done little more than the Cursor left key would do. In the system profile, you can choose to have the Backspace key behave in a more normal fashion.

The philosophy manifests itself in other ways. Since I could not "insert" a tab character, I had to create a macro to insert five spaces at the start of each paragraph. You can insert new tab rulers, but the tabs do not affect text that is already entered. If you want to readjust tables in your text, you have to move them around manually.

To sum up: *Enable* doesn't work the way I do, but it does pack a lot of power into a little package at a reasonable price. If you are willing to consider an integrated package and can use the benefits of mixed text, spreadsheets, and graphics, then text drive *Enable*. Look out for a conflict of philosophies, though, to be certain that you will end up with a compatible program.—Alfred Poor



## EXPANDED FACT FILE

### Enable 1.1

The Software Group  
Northway Ten Executive Park  
Ballston Lake, NY 12019  
(800) 612-0233  
(800) 338-4646 (in N.Y. state)

Requires: 256K RAM, two disk drives, DOS 2.0 or later.

CIRCLE 667 ON READER SERVICE CARD

List Price \$695



### FORMATTING FEATURES FOR FINAL TEXT

Paragraph Formats: JL, JR, JC, JN  
Margins: LM, L, RM, RO, AO  
Line Spacing: L.S. 1-10, SB  
Character Formats: VP, PS, PW, BO, IT, UL, SP, SB, CB, CSC  
Page Formats: LIT, LLB, GL, GR, LP-900, HT, HL, HR, FL, FR, PL-99.9, PW-99.9  
Tabulation Format: TL, TC  
Header/Footer: ML, UM, OF, AN, RN, PA, THF

Multiple Column: TC, NC

### EDITING SCREEN DISPLAYS

Notext Display: RO, CC, LN, DF, DK, DR  
Text Display: SL, Z3, SC, 78, WA, WD, FJ

### TEXT ENTRY AND EDITING

Typing/Editing: FC, IT, OD, CA  
Deletion Formats: CD, WA, WE, WB, LA, LE, SA, SE, PA, PE, PGA, PGE, PGB, DA, DE, DB

### Character Features: HB

Cursor Movement: CM, CK, SD, NC, NL, NW, NS, NP, NSC, NPG, BL, BS, BP, BSC, BPG, BD, JM

### Block Editing Tools: HL, AB, LN, MV, CP,

DE, AR, DF, TM, AW, HF, FN  
Search and Replace: FO, BK, CS, WW, AS, WS, WR, VY  
Undo/Redo: UD, RP

### PRINTER SUPPORT

NP-40, PT, ES, EO, CH, PW, PS, OF

### FILE HANDLING

Document File Strategy: FD, DF, CT, ASC  
Document Saving: NB, MS, EN, EL  
DOS Facilities: DR, MU, CDK, ADK, CDR, ADR  
File Import and Export: IM, IAL, IWS, IOTH, EAL, EWS

### SPECIAL FEATURES

Other: KM, CS, MM, MMD, FP, FE, AI, AT, GR, FL, OG, DV, MS, MC, MT, MA, TC

## FRAMEWORK II 1.0

**V**iewed simply as a word processor—a tool for creating, revising, and printing text—*Framework II 1.0* compares favorably with most other programs now on the market. It's simple to learn and quick on its feet, and it offers a lot of features: macros and abbreviations (glossary entries); automatic paragraph indentation (positive or negative); an excellent spelling checker; a word counter; diplomatic relations with *MultiMate*, *DCA*, and *WordStar* (as well as standard ASCII); an undo facility; windowing; automatic paragraph reformatting; on-screen display of bold, underlining, and (on graphics screens) italic; support for two printers and one plotter at any given time; and template files for



Enable lets you manage the screen display, controlling the size and position of each window.

## ■ WORD PROCESSING

print formatting—to list only a few.

But, of course, *Framework II* is more than a word processor. As a consumer product (that is, apart from its potential as a programming tool), *Framework II* goes beyond the realm of ordinary text processing in two important ways: It allows the integration of spreadsheet, database, or graphic information with text, and it has the ability to create hierarchically structured documents or whole projects. This structuring talent is the basis of *Framework II*'s outlining facility.

**STARTING OUT** To create a new text document in *Framework II*, you start by creating an empty frame. What you get looks like an empty box; it has a border to which you supply a name, and a contents area in which you do your writing. Like windows on the Macintosh or in other PARC-inspired environments, your frame may be "sized" (made larger or smaller) and "dragged" (repositioned). It also may be collapsed into a "tray" (so it won't distract you while you work in other frames) or zoomed to full-screen dimensions.

The editor, like all the rest of *Framework II*, uses a pop-down-menu command style. A primary menu bar appears at all times on the top line of your screen; from this menu, secondary menus descend at the press of the Ins Key (*Framework II* calls this key "instruct") and puts the insert/type-over toggle on one of the secondary menus). When you press Ins, you get the last secondary menu you called; if that isn't the one you want, you move from menu to menu by means of the Cursor right and Cursor left keys. Once your menu appears, you move from option to option with the Cursor up and Cursor down keys, and you use the Return key (or Ins again) to select an option.

Alternatively, you can execute commands by means of Ctrl-key combinations. Ctrl-W, for example, pulls down the Words submenu directly, and once that menu is on-screen, typing B (or Ctrl-B) selects boldface. In other words, *Framework II* offers choices: If you use it only occasionally or you're not comfortable with the Ctrl key, you can point and shoot any command in the system; if you're handy at the keyboard, you can get things done a little more quickly by using *Framework II*'s

two-stroke command sequences.

The program also uses the ten unshifted function keys. For example, F1 calls context-relevant help; F9 zooms or unzooms a frame; F7 and F8 do moves and copies, and so on. Naturally, the functions of these keys are the same throughout *Framework II*'s various application contexts.

**DEFINING BLOCKS** Like *Microsoft Word*, *Framework II* takes an extended-cursor approach to block definition. Something is defined (or "selected," to use *Framework II*'s terminology) at all times; that defined area is highlighted. When you're writing, the selection normally coincides with the cursor, and what you see is a one-character-wide highlight at the position where your next character will appear.

At any time, however, you may extend the selection by pressing F6, followed by one or more of the cursor keys. The block you highlight in this manner is the object on which your next command—delete, underline, justify, move, copy, spell-check, word-count, print, whatever—will take effect. If you want to apply a command to the entire contents of a frame, you may do so either in the manner just described or by going back to the frame border and issuing the command there. If you want to apply a command to text not yet created, you simply issue the command and it stays in effect until overridden.

This way of working does not entail significantly fewer keystrokes than the Wang/WordStar approach of planting markers before and after a block, but, to



## EXPANDED FACT FILE

### Framework II 1.0

Ashton-Tate  
20101 Hamilton Ave  
Torrance, CA 90502  
(213) 204-5570

List Price: \$695



Requires: 384K RAM, two disk drives, DOS 2.0 or later.

CIRCLE 666 ON READER SERVICE CARD

### FORMATTING FEATURES FOR FINAL TEXT

**Paragraph Formats:** JL, JR, JC, JN  
**Margins:** LM:0, RM:255, AL:AO  
**Line Spacing:** LS:1-255, WC, OC  
**Character Formats:** PS, BO, IT, UL, CB, ASC  
**Page Formats:** LIT, LLB, GL, GR, LP:255,  
HT, HL, HR, FB, FL, FR, PL:255,  
PW:255, MP

**Tabulation Format:** TL, TR, TD, TC, DC  
**Header/Footer:** SL, OF, UP, AN, RN, PA, THF

### EDITING SCREEN DISPLAYS

**Nontext Display:** CC, LN, DF, DA  
**Text Display:** SL:20, SC:80, WA, FJ

### TEXT ENTRY AND EDITING

**Typing/Editing:** FC, IT, ID, CA  
**Deletion Formats:** CD, WE, WB, DA  
**Character Features:** SH, HB  
**Cursor Movement:** CK, NC, NL, NW, NS, NP,  
NSC, BL, BS, BP, BSC, BD, SU, SD, SL,  
SR  
**Block Editing Tools:** HL, AB, CH, WD, LN,  
SE, PH, CE, BC, DO, MV, CP, DE, FC,  
FP, AR, HA, DF, TM, AW  
**Search and Replace:** FO, CS, CI, CP, AS, WS,  
VY  
**Undo Utility:** UA

### PRINTER SUPPORT

PF:100, PT, ES, BO, QU, PS, OF, AE

### FILE HANDLING

**Document File Strategy:** DF, CI, CS, OTH  
**Document Saving:** NB, MS, EN, ER, EL

**DOS Facilities:** DR, MU, CDK, ADK, CDR, ADR

**File Import and Export:** IM, IAP, IIBM, IWS, IOTH, EAL, EIBM, EWS, EOTH

### SPECIAL FEATURES

**Spelling Checker:** WD:80000, UG, US, SW, DB, ED, MD, IC, BG, MR, IM, AD, QK  
**Other:** KM, CK, MM, MMD, AT, GR, OG, DV, TV, TM, MC, MT, MA, TC



*Framework II* uses pop-down menus for most of its commands; the document displayed here would illustrate the sentence highlighted in the frame labeled Review.

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**BackComm** is menu-driven and command-driven.



CIRCLE 113 ON READER SERVICE CARD

## ■ WORD PROCESSING

this user at least, it's somehow more intuitive and comfortable. You see the block being highlighted as you extend the selection (much as you do in 1-2-3, incidentally), and so the process is more like saying, "I want this, this, this, and that," than like saying, "Start here and end there."

**SOME DRAWBACKS** There are, unfortunately, a few deficiencies in *Framework II's* editor. The program doesn't do footnotes, and it doesn't have formatting options for superscripts or subscripts (you can work around the latter limitation by passing codes to your printer via Alt and the numeric keypad). Tab stops within word frames must be at equal intervals (the best way to create tables in *Framework II* is to do them in spreadsheet or database frames, then copy the data into a word frame). There's no automatic backup feature, but the program has a quick-save command, Ctrl-Return, that's so easy to

use you'll learn to do it automatically anytime you're interrupted in your work.

There is also one major drawback to the program as a whole: It's copy protected in such a way that if you have it installed on a hard disk, you can't do a global file-by-file backup with the DOS BACKUP command. You can uninstall it from your hard disk, then do your backup, then reinstall; but all that baloney adds a good 5 to 10 minutes to an already tedious, time-consuming chore. Worse yet, a spokesperson at Ashton-Tate says you'll "probably" run into trouble if you try to back up *Framework II* onto a tape system (using a file-by-file—as opposed to an image—backup procedure), and the manuals say zip about this potential disaster.

**STRUCTURING A DOCUMENT** The most distinguishing feature of *Framework II* as a word processor is its structural capability. Let's say you're going to create a

document in ten parts. Instead of doing all your work in a single frame or in ten unrelated frames, you can create one containing frame with ten subframes inside it. As far as DOS is concerned, you'll have created only one file (DOS will recognize it by the name you've given your containing frame); but, from your point of view, you'll have ten logically associated units. With this structure, you can do such things as pass data back and forth between subframes, rearrange the order in which the subframes appear, and apply formatting or printing commands to the entire assemblage (or parts of it).

In the "normal" way of looking at things (what *Framework II* calls "contents view"), you see this structure as a stack of ten frames within a containing border; you don't see them all at once, but you can navigate from one frame to the next just as you would scroll through a block of text. By pressing F10, however, you can flip

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CIRCLE 478 ON READER SERVICE CARD

the structure into what *Framework II* calls "outline view." Now you see a two-level outline in which the main entry is the name you've given the containing frame and the subentries are the names you've given each subframe. If you like, *Framework II* will number the subentries (either in documentation style, with decimal points separating logical levels, or in traditional roman numeral outline style) or use the outline-view structure to generate a table of contents for the completed document.

You can take *Framework II*'s structuring facility as deep as you like, with one proviso: Only the innermost subframes can contain text; a frame can contain subframes or it can contain some other kind of data, but not both. Theoretically, you could create an entire book as a single document, assigning the book title to the outermost containing frame, part titles to the next level, chapter titles to the second subordinate level, sections within each chap-

■ **Framework II compares favorably with most other word processors—but, of course, it's much more than a word processor.**

ter to the level after that, and finally your text. *Framework II* supports the Lotus/Intel/Microsoft Extended Memory Specification (and offers a virtual memory driver besides), so memory limitations would not be a barrier to such a project.

Other natural applications for *Framework II*'s structuring facility include brainstorming (using outlines the way your

tenth-grade English teacher wanted you to) and the creation of document libraries. Documents, such as letters or memos, can be created independently and subsequently gathered into hierarchical structures for organizational or recordkeeping purposes—a process you might think of as outlining the past.

In sum, *Framework II* is a text management tool as well as a tool for writing and editing. It's ideal for those who have lots of verbal (or numeric) bits and pieces to keep track of, and it's ideal for those who do any kind of creative writing. It's also easy enough to use (as a word processor, anyway) that unskilled operators can do routine clerical work with it. On the output side, it's less versatile than the most powerful formatting tools available (*Microsoft Word*, for example), but, for many users at least, its shortcomings in that area are more than offset by its unique structuring capabilities.—Craig Stinson

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CIRCLE 175 ON READER SERVICE CARD

## ■ WORD PROCESSING

### GET ORGANIZED! 1.1

If there were different categories for integrated programs in this review project, then *Get Organized! 1.1* (or *GO!*, as Electronic Arts cutely calls it) would clearly be in the "personal" group.

*GO!* has enough of the required features to be called an integrated package. It has a word processing module, complete with headers and footers. It has an address book and a filecard database, both of which can be used to create merge letters. It has a telecommunications module and can also be used as an autodialer. While it has no spreadsheet, it does have a serviceable calculator and a notepad on which you can write short notes. Most of the applications are displayed in small windows on the screen, which you can move around to

achieve a tiled effect.

The operative words from the above description are small, adequate, and serviceable. *GO!* works but is not really suitable for tasks beyond home and personal applications. It is too limited in terms of speed, capacity, and functionality.

**PACKAGING** From the outside, the program looks impressive. It comes in a standard slipcase, surrounded by a cardboard sleeve. Slide off the sleeve, however, and you get the impression that things are not all they appear to be. Inside is a thin, spiral-bound manual, a folder with the program disks, and a cardboard divider taking up the remaining third of the box. The box is a masterpiece of package design, but the lack of complexity of its contents mirrors the program itself.

The manual is skimpy, and there is no

fixed tutorial. Some loosely designed exercises introduce you to the major program components, but the manual contains few sample files with which to experiment, and most of the more complex features are not covered at all. The remaining reference sections are not clearly organized, but a good index makes it possible to locate most topics quickly.

You select the application you want to work with from a 1-2-3-like menu at the top of the screen. You can also "jump" directly to an application using a function key combination. This leaves the last application on the screen; it is inactive, but you can refer to its contents. You cannot have more than one window of each application open at a time.

Once you have made your selection, you are presented with a submenu at the top of the screen; its commands can present yet another layer of submenus. Once you get down into the window of the application itself, you will find that a number of function keys are active, and all will behave in the same way in the different applications. *GO!* comes with a handy (if flimsy) function key template that describes these commands and the jump options.

Within the word processor, you have block copy, move, and delete commands. You can also cut and paste text to and from a buffer area. This capability permits you to move information from one window to another. One of the nice features about *GO!* is that it comes with predefined templates that quickly gives you a personal or formal letter or another format ready to fill in. These templates have predefined merge fields, so that you simply call up a filecard from your address book, invoke the merge command, and the blanks are filled in automatically. I used the template as the basis for the letters in the test procedure, and it certainly saved me lots of time.

**NO *GO!*** The time saved by the predefined templates was offset by limitations in other areas. For example, on the search and replace function, *GO!* is case-sensitive, so you must make multiple passes to find "Trees" and "trees." Even more important is the lack of any wildcards in the search function. You cannot search for a carriage return, which is handy when you are importing files.



## EXPANDED FACT FILE

### Get Organized! 1.1

Electronic Arts  
2755 Campus Dr.  
San Mateo, CA 94403  
(415) 571-7171

List Price: \$99



Requires: 256K RAM, two disk drives recommended, DOS 2.0 or later.  
CIRCLE 665 ON READER SERVICE CARD

#### FORMATTING FEATURES FOR FINAL TEXT

Paragraph Formats: JL, JC, JN  
Margins: LM:0, RM:80  
Line Spacing: LS:1-2  
Character Formats: VP, BO, UL, SP, SB, CB, ASC  
Page Formats: L:1T, LLT, GL, LP:256, HT, HL,

FT, FL, PL:256, PW:8.5

Tabulation Format: TL  
Header/Footer: SL, UM, OF, AN, PA, THF

#### EDITING SCREEN DISPLAYS

Nonext Display: RO  
Text Display: SL:22, SC:80, WA

#### TEXT ENTRY AND EDITING

Typing/Editing: FC, IT, ID, CA  
Deletion Formats: CD, LA, LE, DA  
Character Features: HH  
Cursor Movement: CM, NC, NL, BL, BSC, BD  
Block Editing Tools: HL, AB, MV, CP, DE, AR, HA, AW, HF  
Search and Replace: FO, CS, WW, AS, FS, FR, VY  
Undo Utility: NA

#### PRINTER SUPPORT

NP:21, PS

#### FILE HANDLING

Document File Structure: FD, LM, DF, OTH, DS:3300 PAGES

Document Savings: AB, MS, EN, EA, EL  
DOS Facilities: DR, MU, CDK, ADK, CDR, ADR

File Import and Export: IM, IAL, EAL

#### SPECIAL FEATURES

Other: CS, SF, MM, DV, MS, TC



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Editing text is also cumbersome in other ways. You cannot insert a tab character to indent the start of a paragraph; instead you must insert the number of spaces you want. There are no decimal tabs, and you cannot save a block to file.

GO! has a curious method of automatically reformatting text as you edit. After you set a delay value (from 0 to 5), GO! will wait for a pause in your typing to move everything around. If you keep trying long enough and fast enough, you can build up a huge string of unformatted text. When you finally pause, the screen gets a case of the St. Vitus boogie as words rush about to find their places.

Formatting limitations include having no more than six lines for headers and footers, including the spaces required to separate them from the body of the text. You can select either single or double spacing,

■ GO! is suitable for personal applications. The operative words are small and serviceable.

but the choice remains in force throughout the entire document. About the only embedded commands available are for printer font control. Cursor control is similarly limited; you can go to the beginning or end of a line, screen, or file, but there are none of the familiar amenities such as move to the next or previous word.

If you work at it, you can find some useful shortcuts within GO! For example, while there are no documented macro facilities, if you set the search string to null and then enter your characters in the replace string, the replace function key will insert your string wherever you wish.

The high-end integrated packages are certainly under no threat from *Get Organized!* However, if you need some straightforward (albeit limited) tools that can help you get your personal life in control and if price is a factor in your decision, *Get Organized!* may be worth a look.

—Alfred Poor

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## WORD PROCESSING

### SYMPHONY 1.1

**S**ymphony 1.1's integrated bag of tricks includes a solid, no-frills word processor. Since this module uses a lot of standard *Symphony* commands, it sometimes feels like a spreadsheet. This feel isn't a disadvantage, though, because logical command patterns and ease of use haven't been sacrificed just for the sake of consistency.

Anyone who has used a Lotus spreadsheet will learn *Symphony*'s word processor in a flash. The kinship is most obvious in the way the End key on the cursor keypad drives the cursor within a document. The End-Cursor left and End-Cursor right combinations take you to the beginning or end of a line. Home and End-Home take

you to the beginning or end of a document, and End-Cursor up and End-Cursor down do the same for paragraphs. Nothing could be easier or more natural for Lotus spreadsheet users.

And in word processing the End key is even more useful than it is in Lotus spreadsheets. If it's followed by a letter, space, or carriage return instead of a cursor key, the End key will take you to the next occurrence of that character. This is a handy way to move around in a document, but it's strictly a one-way street. There's no way to change direction and move the cursor to the previous occurrence of a character.

Another debt the word processor owes its spreadsheet cousins is its command style. Hitting a single key gives you a two-line menu at the top of the screen. You make a choice either by moving the cursor

and hitting Enter or by typing the first character of your selection. This is how you run the Search, Replace, and Format commands, as well as block commands like Copy and Move. It's a natural adaptation of the by-now standard spreadsheet procedure, and the commands themselves run smoothly.

Block commands work by highlighting a piece of text. *Symphony*'s excellent End key cursor controls work within the block commands to make it easy to define, modify, and move a block. You can expand or contract the highlighted block until you've got it exactly right, and you can even change the point at which the block begins.

Macros are another dividend found in *Symphony*'s spreadsheet-based word processor. You can use them to do nothing more complicated than playing back frequently used words or phrases, or you can automate complex command sequences like those that set up formats or copy spreadsheet data into text.

**INHERITED DEFECTS** There are a few areas, however, where the word processor's integration with a spreadsheet is a disadvantage. One important performance problem is speed. Perhaps because it checks the relationships of spreadsheet cell addresses every time it does anything, *Symphony* takes its own good time formatting and reformatting text. It also has a balky, unattractive way of scrolling the text on screen. Finally, if you have *Symphony* set to be in manual recalculation mode, you get a "calc" message every time you add text. Sure enough, the message goes away when you hit the Calc key, even if there isn't a single number in the whole document. It's petty, but it's annoying all the same!

*Symphony* also lacks a lot of the features you would expect from a standalone professional-class word processor. It has never heard of indexes, footnotes, chapters, sections, mail-merge, or tables of contents. Headers and footers can be no longer than one line, and you can't adjust their position on the page—they're always three lines above or below the main text. *Symphony* won't print columns (you have to use its spreadsheet to do that) or give back your last deletion, and you can't open extra windows or edit more than one docu-



### EXPANDED FACT FILE

#### Symphony 1.1

Lotus Development Corp  
55 Cambridge Pkwy  
Cambridge, MA 02142  
(617) 577-8500

**Requires:** 384K RAM, one disk drive, DOS 2.0 or later.  
**CIRCLE 664 ON READER SERVICE CARD**

List Price: \$695



#### FORMATTING FEATURES FOR FINAL TEXT

Paragraph Formats: JL, JR, JC, JN  
Margins: LM:0, RM:240  
Line Spacing: LS:1-3  
Character Formats: VP, PS, PW, BO, IT, UL, SP, SB, ST, CB, ASC, CT  
Page Formats: LIT, LLB, GL, GR, LP:100, HT, HL, HR, FB, FL, FR, PL:100, PW:240  
Tabulation Format: TL

#### Header/Footer: SL, AN, RN, PA

**EDITING SCREEN DISPLAYS**  
Nontext Display: RO, CC, LN, DA, TI  
Text Display: SL:20, SC:80, WA, FI

#### TEXT ENTRY AND EDITING

Typing: T:iting, IT, ID, DM, IM  
Deletion Format: CD  
Character Features: HB  
Cursor Movement: CM, CK, SD, NC, NL, NW, NS, NP, NSC, BL, BP, BU, SD, SL, SR, JC, JL, JP, CK  
Block Editing Tools: HL, AB, CH, WD, LN, SE, PH, CE, BC, MV, CP, DE, AR  
Search and Replace: CS, WW, AS, VY  
Undo Utility: NA

#### PRINTER SUPPORT

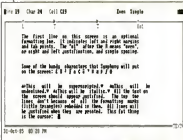
NP:23, UP, PS

#### FILE HANDLING

Document File Strategy: FD, DF, OTH  
Document Saving: NB, MS, EN, DL  
DOS Facilities: DR, CDP, ADK, CDR, ADR  
File Import and Export: IM, IAL, IOTH, EAL, EOTH

#### SPECIAL FEATURES

Spelling Checker: WD:80000, UG, US, DB, IC, BG, MR, IM, AD, QK  
Other: KM, SF, GR, FL, SC, DV, MC, MA, TC



The *Symphony* 1.1 word processing screen shows embedded formatting commands and a few non-ASCII characters.

ment at a time. It doesn't eliminate widows and orphans, nor does it let you keep charts or figures from being broken up at page breaks.

*Symphony* also doesn't show character format type attributes on screen. You have to put funny control characters in the text in order to italicize, underline, or boldface. You can, however, combine attributes to get things like italicized boldface superscript, so long as your printer can print it.

**ADD-IN SPELLING** *Symphony* doesn't come with a spelling checker, but you can buy one for \$39 as an add-in; you can run that without leaving *Symphony*. However, you can't run it without *Symphony*, which is a curious disadvantage. Moreover, it's slow and it's a memory hog. Lotus suggests 512K bytes of RAM as the minimum

■ Anyone who's used a Lotus spreadsheet will learn *Symphony* in a flash—but it lacks a lot of features one expects from a professional-class word processor.

for running a spelling checker. Since *Symphony* can export ASCII files, you're better off with someone else's spelling checker.

One thing *Symphony* does do in grand style is the disk-based tutorial. It's clear, useful, and lets you play with the actual program. The manual is well written and has an introductory How-To section as well as a more complete reference section.

*Symphony* is just as good as some of the simpler word processors on the market, and if you're constantly slinging spreadsheets into your documents it will be a timesaver. But if you ever have to write anything more complex than letters and memos, you'll wish you had something better.—Jared Taylor

Complete with tape drive, controller, and software

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## GEM WRITE 1.0

**G**EM Write 1.0 is a scaled-down version of *Volkswriter Deluxe* for people who want to write letters and memos using the graphics talents of Digital Research Inc.'s *GEM Desktop*, a Macintosh-like mouse and windowing environment.

Created for Digital Research by Life-tree Software Inc., maker of *Volkswriter Deluxe*, *GEM Write* looks a lot like *MacWrite* running on a Macintosh. There is a similar black-on-white display that shows print enhancements such as italic and underlining, pull-down menus, a mouse pointer, and even pictures.

The ability to easily merge graphics with text is *GEM Write*'s strongest feature. Digital Research emphasizes that by not marketing *GEM Write* as a standalone product, you can get *GEM Write* only as part of the *GEM Collection*, a \$199 package that also includes *GEM Desktop* and *GEM Paint*. This combination provides a basic graphics workstation that allows you to prepare presentations or bypass the typesetter to do your own desktop publishing.

Installing the *GEM Collection* on a hard disk system is quick and easy. When you follow the instructions in the manual and the on-screen prompts, the process takes

less than 10 minutes. The 114-page *GEM Desktop* manual provides clear instructions on how to use the mouse to control the system. Within another 10 minutes, you'll be clicking on icons, scrolling, and changing window sizes as if you've always known how.

After pointing and clicking your way

■ As a partner to *GEM Paint*, *GEM Write* does the job of creating text to go with your pictures, providing the basics of desktop publishing.

into *GEM Write*, you face a clean editing screen, where you can begin typing. If you want to revise an existing file, you pull down the file menu and follow the prompts to read the document. If you begin by retrieving the program's tutorial files, you can learn most of the program's functions without having to refer to the manual.

You can issue editing commands via

the pull-down menus or from the keyboard, either by using function keys or by pressing alphabetic keys in combination with the Ctrl key. The function key commands are the same ones used by *Volkswriter Deluxe*, and the alphabetic commands mimic *WordStar*. For instance, you can center a line of text by pointing to the center command on a pull-down menu, pressing a function key, or using the *WordStar* Ctrl-O-C command.

But despite its *Volkswriter Deluxe* and *WordStar* compatibility, *GEM Write* is not competing with the big boys. It's a no-frills program that covers the word processing basics such as word wrap, cut and paste, search and replace, boldfacing and underlining, and some print format control. Using the format menu, you can control spacing and margins for the entire document, and using embedded commands, you can create headers and footers. But you can't mix formats to produce, say, a single-spaced paragraph in a double-spaced document.

Because it is part of an integrated environment, *GEM Write* is more than a barebones program. It partakes of the *GEM Desktop*'s print-spooling abilities, which allow you to print a series of documents while you go on editing. It has the *GEM Desktop* accessories, including a clock with an alarm and a pop-up calculator. And since it shows print enhancements on-screen, it brings new meaning to the term "what you see is what you get."

However, if you expect to use *GEM Write* for extended work sessions, you should seriously consider opting for a high-resolution display card and monitor. When used with the standard IBM color/graphics adapter, the black letters are jagged and hard to read. Although I often use the standard color/graphics text characters for my word processing with little or no eyestrain, after using *GEM Write* for an hour or two, my eyes felt tired and teary. If you use the program with a higher-resolution display card, such as the Hercules card or the IBM Enhanced Graphics Adapter, this problem goes away. However, be forewarned that *GEM Write* won't appear in high resolution if you use a "bare" EGA; you have to get the expanded memory kit before you see any improvement in resolution.

Another hardware caveat is in order. Although Digital Research does not recommend a hard disk, running *GEM Write* on a floppy disk system can severely try your patience. You need three disks to boot up the system, and you'll have to do a lot of disk swapping once you're up and running. For instance, if you want to delete a file, you have to exit from *GEM Write*, insert the *GEM Desktop* disk in drive A:, delete the file, then reinsert your *GEM Write* disk and go back to *GEM Write*. You also need to go back to the *GEM Desktop* anytime you change data disks.

Even on a hard disk system, *GEM Write* won't set any speed records. While it scrolls from screen to screen in less than a second, it takes almost 2 seconds to rewrite the screen when you add a line, and the screen display lags significantly behind a

repeated delete-character command. If I held down the Del key and used my PC's autorepeat feature, I often deleted more characters than I had intended. This is slow compared with *GEM Write*'s big brother, *Volkswriter Deluxe*, but considering that the PC works a lot harder updating a graphic image than a text image, *GEM Write*'s performance is in the acceptable range.

As a partner to *GEM Paint*, *GEM Write* does the job of creating text to go with the pictures, providing the basics of desktop publishing. In the same class with personal word processors such as *PFS:WRITE*, *GEM Write* is a simple, easy-to-use program with a low price. If your word processing needs are modest and you need *GEM Write*'s graphics talents, this might be the program for you. —Dara Pearlman

## MICROSOFT WINDOWS WRITE 0.73

The first time you type something into *Microsoft Windows Write* 0.73 and see your text appear on the display in proportionally spaced Helvetica, you will leap out of your seat in joy, run around the room a few times, and then sober up when you realize you can't possibly print out the same proportional font on your inexpensive dot matrix printer. Right? Wrong! The second shock occurs when *Write* puts your printer into graphics mode and prints exactly the same fonts it displays.

The *Write* word processor is part of *Microsoft Windows*, Microsoft's long-awaited... sorry, I almost said "Macintosh clone." The manual calls *Windows* "an extension of the DOS operating system." (Be sure to read "Operating in a New Environment" elsewhere in this issue for reviews of *Windows* and other new operating environment alternatives.) It is a menu/mouse-driven multitasking and program-integration environment. You may simultaneously run multiple applications in different windows on the display and cut and paste numeric or graphic text among them. The *Windows* display uses high-resolution graphics that show up in black and white with the regular *ColorGraphics* Adapter but in color with IBM's Enhanced Graphics Adapter.

*Write* cannot be run outside of *Windows*, since it requires the menu routines and Graphics Device Interface (GDI) that are built into the *Windows* system. It makes extensive use of the pull-down menus characteristic of other *Windows* applications and similar operating systems. However, users of *Microsoft Word* (Microsoft's professional word processor) will recognize some similarities, such as the use of scroll bars, text selection with the mouse, and definitions of document, paragraph, and character formatting.

*Write* holds its own against small personal word processors. It handles small document chores well, and its formatting features are limited but adequate for many




**EXPANDED FACT FILE**

**GEM Write 1.0**

Digital Research Inc.  
60 Garden Court  
Menlo Park, CA 94025  
(415) 443-4200  
(415) 649-3896  
Requires: 256K RAM, two disk drives, DOS 2.0 or later, and GEM Operating Environment

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### FORMATTING FEATURES FOR FINAL TEXT

Paragraph Formats: JL, JN  
Margins: LM:1, RM:250, AI  
Line Spacing: LS:1-3  
Character Formats: PW, BO, IT, UL, CB, ASC  
Page Formats: LIT, LLT, GL, LP:99, HT, HL, HR, FT, FL, FR, PL:99, PW:250  
Tabulation Format: TL  
Header/Footer: SL, UP, AN, RN, PA

### EDITING SCREEN DISPLAYS

Nonexit Display: RO, CC, LN, PN, DF, DK, DR  
Text Display: SL:21, SC:75, WA, WD  
TEXT ENTRY AND EDITING  
Typing/Editing: FC, IT, OD, CA, IM  
Deletion Formats: CD, WE, LA, LE, DA  
Character Features: HH, HB  
Cursor Movement: CM, CK, SD, MS, NC, NL, NW, NSC, NPG, BL, BSC, BPG, BD, SU, SD, SL, SR, JP  
Block Editing Tools: HL, AB, MV, CP, DE, FC, AR, DF  
Search and Replace: FO, CS, AS, VY  
Undo Utility: NA

### PRINTER SUPPORT

NP:9, PT

### FILE HANDLING

Document File Strategies: DF, CT, ASC, DS:512 KBYTES  
Document Saving: AB, DB, MS, EN, ER, EL  
DOS Facilities: DR, MU, SDK, CDR  
File Import and Export: IM, IAL, EAL

### SPECIAL FEATURES

Others: SF, GR

*GEM Write* uses pull-down menus for most program commands. Here you see the format menu, which allows you to set spacing and left margins for the entire document.

## ■ WORD PROCESSING

users, and very easy to use. As a freebie in the \$99 *Windows* package, it cannot be beat. But, in truth, *Write* is almost a toy compared with *Word*. The two programs share many concepts and operating philosophies, and documents may be transferred from one to the other (with some limitations), but *Write* lacks many of the features required for serious word processing. Will we one day see a program that merges the neat tricks of *Write* with the power features of *Word*? I'll be waiting.

### CHARACTER FORMATTING ON-SCREEN

*Write*'s on-screen character formatting is the real highlight of the program. You first use the mouse to select some text. You then point to the "character" item in the top-line menu and select one or more of the options. For fonts, you have a choice between proportionally spaced Helvetica and Times Roman and monospaced Courier and Pica. The available point sizes range from 4 (30 characters per inch) to 12 (10 cpi) for Helvetica, and all the way up to 127 (about 1 cpi) for the other three fonts. You can specify italic or bold with any font, as well as underlining, subscripting, or superscripting. All character formatting is displayed on-screen and, in true WYSIWYG fashion, it prints in exactly the same way. When you start mixing a lot of fonts and sizes, however, you'll find *Write* gets mired in seemingly interminable disk accesses. This is not surprising. It has a lot of work to do.

*Write*'s paragraph formatting is similar to the character formatting. You block out the paragraph using the mouse, pull down the paragraph menu, and then just move the highlight bar to the options you want. These options include paragraph justification (left, right, centered, or justified), line spacing, and paragraph indentation. You can set tabs (either left or decimal) either by typing the explicit measurements in a pop-up menu or by displaying the ruler line and just mouse-clicking them in.

The integration of the *Windows* utilities allows you to cut and paste among the *Windows* applications supplied by Microsoft. You can draw a picture in *Paint* (another program that comes with *Windows*) and move it into a *Write* document. You can even cut a graphics image from an "old application" (that is, one not specifi-

cally written for *Windows*) such as 1-2-3 and paste it into *Write*. *Write* provides the means to then move or size the transferred image. Unfortunately, there's a rather severe limitation here: *Write* treats a graphics image as a separate paragraph, so you can't have a text and a picture side by side in the document (unless, of course, you created the text in *Paint* rather than in *Write*—but then you can't edit the text in *Write*).

If you consider the calculation work involved in displaying proportionally spaced text in bit-mapped high-resolution graphics, you may deduce that *Write* operates somewhat slowly. This is true. At times, you'll get the impression that you're word processing under water. Fast typists will often have to wait as the display catches up with their fingers. You'll also see your

disk lights flash on and off frequently while using *Write*, halting your editing in the process.

Printing even a short document in graphics mode takes a long time. *Write* must retrieve the fonts and some overlay files from the disk, compose the document, save the print image in a file, and then turn the actual work of printing over to the print spooler. Once the print spooler takes over, in theory you can continue working, either on the same document or on another. However, the time-slice wrestling within *Windows* often makes further work difficult. The printing itself is slow because it's working in graphics mode, so you don't want to slow it down further. Fortunately, the print menu includes a draft quality option so that you can print in character rather than graphics mode. This



## EXPANDED FACT FILE

### Microsoft Windows Write 0.73

List Price: \$99

Microsoft Corp.  
10700 Northup Way  
Box 97200  
Bellevue, WA 98009  
(206) 828-8080

Requires: 320K RAM, two disk drives, DOS 2.0 or later, and Windows Operating Environment.

CIRCLE 841 ON READER SERVICE CARD



### FORMATTING FEATURES FOR FINAL TEXT

Paragraph Formats: JL, JR, JC, JN, JM  
Margins: LM:1, AJ, AD  
Line Spacing: LS:2, LF  
Character Formats: VP, PS, AP, PW, BO, IT, UL, SP, SB, CB  
Page Formats: LIT, LLB, GL, GR, HT, HL, HR, FB, FL, FR, PL:11, PW:3.5  
Tabulation Format: TL, TC  
Header/Footer: ML, OF, AN, RN, PA, THF

### EDITING SCREEN DISPLAYS

Named Display: RO, PN, DF  
Text Display: SL:22, SC:79, WA, FJ

### TEXT ENTRY AND EDITING

Typing/Editing: FC, ID, CA  
Deletion Formats: CD  
Cursor Movements: CK, MS, NC, NL, NW, NS, NP, NSC, NPG, BL, BS, BD, SU, SD, SL, SR, JP

Block Editing Tools: HL, AB, CH, WD, LN, PH, DO, MV, CP, DE, FC, FF, AR, HA, DF, AW, HF

Search and Replace: FO, CS, CI, CP, WW, AS, WS, WR, FS, FR, VY

Undo Utility: UA, UR

### PRINTER SUPPORT

NP:15, ES, EO, QU

### FILE HANDLING

Document File Storage: LM, PG, DF, ASC  
Document Savings: AB, DB, MS, EN, EL  
DOS Facilities: DR, MU, CDK, ADK, CDR,

ADR  
File Import and Export: IAP, IOTH, EAP

### SPECIAL FEATURES

Others: CS, GR, FL



You can live up your Windows Write documents by drawing a picture in Windows Paint and moving it in. A Write Edit function then allows you to resize or move the picture.



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speeds document printing up considerably, at least until you need a final draft.

You can run *Windows* and *Write* with a dual-drive system and 320K bytes of RAM, but you'll be much better off with a beefed-up PC. Although the *Windows* manual spends equal time discussing running the program from two disk drives or a hard disk, a hard disk is almost essential to

■ The shock occurs when Microsoft *Windows* Write puts your matrix printer into graphics mode and prints the same font it displays.

take full advantage of *Windows'* other features. You can't run it with the IBM monochrome adapter, and you should use 640K bytes of RAM with it. A large RAMdisk installed in expanded memory will help for switching among multiple applications. Some people argue that *Windows* requires an AT and an Enhanced Graphics Adapter to really show its power.

While you can do everything from the keyboard, a mouse helps out enormously. Yes, I know, I once felt the same about mice as my cat does, but it really beats learning a bunch of unusual and new keyboard commands. Some of the function keys in *Write* helpfully duplicate menu commands (such as F3 to repeat the last text search and F9 to reduce the size of a font). These function key alternatives are shown on the menus, so even though *Write* does not include any on-line help, it's really not necessary.

For short documents, *Write* works just fine and is lots of fun. For more serious word processing, you'll want to use something else. *Write* gives you a glimpse through a window of the future of PC software. As just one part of a \$99 software package that can revolutionize the way you use your PC, *Write* is truly amazing.

—Charles Petzold

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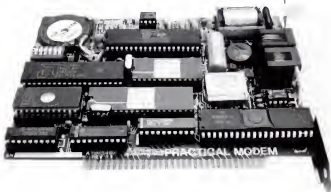
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*It's time again for you to renew your acquaintance with Form 1040. These four representative tax programs can break the ice and do a lot of calculating for you, but they won't do all of the thinking.*

Every spring, each of us faces off with the darling of the Internal Revenue Service, Form 1040. If there's one mathematical exercise that cries out for a computer's help, this is it.

But is it worthwhile to sit down and learn an intricate new computer program just to run it once a year? Well, that depends. How byzantine are your financial affairs? How great is your tolerance for all those interrelated calculations that go into your tax return? Do you have an endless capacity for fetching and carrying numbers back and forth from depreciation tables to schedules of business profit, plodding through formulas about moving expenses or comparisons of 3-year averages with multiplications from tax tables? When you discover that you left out \$437 in a sub-subcalculation, how

great is your patience for redoing it all? It isn't the most cheerful choice.

If you've been tossing your stockbroker's confirmation slips and expense account receipts into an L. L. Bean shoe box all year long, tax return software won't sort them out for you. But if you can't bear to confess your negligence to a friendly neighborhood accountant and prefer to come to grips with the chaos at the privacy of your own desk, then tax return software can help you add it up and get it onto the right lines.

The computer's tireless ability to recrunch the numbers makes it easy to play "what if" with your tax data and may inspire you to more profitable maneuvers next year. For the tax knowledgeable, the software lets you control any judgment calls on how discretionary items are reported.

## ■ TAX PROGRAMS

AccuTax 85 Page 1 of 4  
INCOME (PART 1)

1	Wages	123,456
2	Dividends	12,345
3	Interest	5,678
4	Capital gains	1,234
5	Other income	9,876
6	Charitable deductions	1,000
7	State and local taxes	2,000
8	Other deductions	1,500
9	Business income or loss	0
10	Net capital gain or loss	0
11	Other income	0
12	Other deductions	0
13	Other income	0
14	Other deductions	0
15	Other income	0
16	Other deductions	0
17	Other income	0
18	Other deductions	0
19	Other income	0
20	Other deductions	0
21	Other income	0
22	Other deductions	0
23	Other income	0
24	Other deductions	0
25	Other income	0
26	Other deductions	0
27	Other income	0
28	Other deductions	0
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40	Other deductions	0
41	Other income	0
42	Other deductions	0
43	Other income	0
44	Other deductions	0
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87	Other income	0
88	Other deductions	0
89	Other income	0
90	Other deductions	0
91	Other income	0
92	Other deductions	0
93	Other income	0
94	Other deductions	0
95	Other income	0
96	Other deductions	0
97	Other income	0
98	Other deductions	0
99	Other income	0
100	Other deductions	0

TurboTax Page 6 of 9  
Main Form

1	Wages	123,456
2	Dividends	12,345
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90	Other deductions	0
91	Other income	0
92	Other deductions	0
93	Other income	0
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TurboTax Page 1 of 4  
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86	Other deductions	0
87	Other income	0
88	Other deductions	0
89	Other income	0
90	Other deductions	0
91	Other income	0
92	Other deductions	0
93	Other income	0
94	Other deductions	0
95	Other income	0
96	Other deductions	0
97	Other income	0
98	Other deductions	0
99	Other income	0
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AccuTax (top left) zips you around its forms and schedules with a touch of a function key. TurboTax (bottom left) features a handy "tax window" that gives you a quick update on your tax status at any point. Tax Preparer's information-packed screens are simple but useful; they list available function and menu keys. Digitax 1040 (not shown) packs nearly every federal income tax form and schedule onto its 21 disks.

**A THUNDERING HERD** With all these obvious virtues, it's no wonder that the market is flooded with software for preparing personal tax returns. The November 1985 *Journal of Taxation* lists more than 70 professional-level packages. *PC Magazine* found dozens more that are aimed at the individuals preparing their own returns.

To help you decide whether to use a tax preparation program and, if so, which one, we put over 20 packages up on our screens and selected 4 to examine in detail. We chose our packages to give you an idea of the range of prices and features available. They run from a shareware package that does 15 federal forms and schedules to a professional-level program that starts at \$1,650 for the basic, 40-form-and-schedule federal package and goes up by several-hundred-dollar leaps and bounds if you add integrated state tax returns or a laser

printer driver that draws meticulous tax-form facsimiles. Most offer yearly updates at a reduced price for registered users. The basic truth we confirmed is that tax preparation programs are good at math. We also found out that they can type but they can't think. Since the programs don't think, one of the important parts of the documentation is the disclaimer. Every program has one. If you forget to add in the original discount interest that you don't actually receive from your zero coupon bond or if you feed in a bigger credit or deduction than the tax law allows, the programs will sometimes—but not always—warn you that you're about to make a mistake. If you have complexities in your financial and tax picture involving legitimate choices as to how or when an item is reflected on your tax return, no computer program will take the place of the guidance and advice of a live tax expert—your tax accountant, your tax lawyer, or even H&R Block.

In tax return software, what you get as you pay higher prices are programs that do more forms and schedules and make avail-

able more choices of state tax returns to go along with the federal return. You also get more printing options. At the high end of the market, you get the capacity to churn out professional quantities of returns in your own office with a speed, detail, and accuracy in the same league with those of the mainframe-based computerized tax service bureaus—provided you have a printer that can keep up. (In this day and age that means a laser printer.)

What you don't get for more money is a program that is noticeably easier to learn or to use. Every tax program we looked at requires that you invest a significant amount of learning time to make it do everything it's able to do. You might breeze through a 1040 with only a couple of schedules in 15 minutes or less after you get the hang of it. But hard copies of the tax law and its interpretations take up whole libraries in the offices of any sizable law or accounting firm, and so it is wise to allow yourself an hour or two the first time around and even more time as you increase the number of forms and schedules you plan to fill out. Allow yourself much more time if you are a new computer user as well as a new tax program user.

**NOT QUITE THE LATEST WORD** To bring you our report before the eleventh hour, we had to content ourselves with

## Tax Preparation Software: Summary of Features

Program	Price	On-screen help	Automatic calculations	Built-in calculator	Supports color	State forms available	Pre-printing reviews	Single returns	Batch returns	Prints on Form 1040	Prints other filable forms & schedules
<b>AccuTax</b>	\$35 (payment optional)	Yes	Yes	Yes	Yes	None	Yes	Yes	No	Yes	Yes
<b>TurboTax</b>	\$65, \$32.50 federal personal update fee, \$20 state personal update fee	No	Yes	Yes	Yes	AL, AZ, CA, CO, GA, IL, IN, KS, LA, MD, MA, MI, MN, MO, MT, NE, NJ, NY, NC, OH, OK, OR, PA, SC, VA, WI	Yes	Yes	No	Yes	Yes
<b>Tax Preparer</b>	\$295, update under \$100	Yes	Yes	Yes	No	CA	Yes	Yes	Yes	Yes	Yes
<b>Digitax 1040</b>	\$1,650, \$1,072.50 annual update fee	Yes	Yes	Yes	Yes	AL, CT, DE, FL, GA, IL, MA, NH, NJ, NY, PA, TN, and New York City, Philadelphia	Yes	Yes	Yes	Yes	Yes

running the programs available in November of 1985. All of these were the versions for the 1984 tax year (usually called the 1985 version) or an incompletely updated version that had some, but not all, of the manufacturer's enhancements for tax year 1985 (normally labeled the 1986 version). The manufacturers cautioned us that their final versions would not be ready until later, usually around the first of the year. Several of the software publishers told us in glowing terms about further improvements to be added, but we could review only what we had in hand.

**TESTING, TESTING ...** For each of the four programs, we ran a scenario designed to invoke a representative sampling of each program's features. We put the mythical Smiths on a joint return and gave one spouse a job and the other a business. They had a list of miscellany too small or too large for the law's limits, a tax shelter loss, and a fat capital gain early in the year to precipitate an alternative minimum tax and a penalty for underpaying estimated taxes. Comprising two tightly organized pages of data, the scenario used over a dozen forms and schedules. Instead of undertaking the mammoth job of checking out every feature or fully testing each program's tax logic, we concentrated on the usefulness of the software itself—how

well and how easily it allows you to complete the task at hand.

To see how the intelligent layman would fare, two bright young *PC Magazine* staffers warmed up the programs with a preliminary pass. The typical results of the first airing: "I had some data left over. I can't figure out where these items go and the program doesn't tell me. I need a tax expert!"

On my own initial run, sad to report, not one program came out with a bottom line that matched that of any of the other three programs. Every program was somewhat different in the way it calculated or imposed various limitations on deductions or credits. Most of the discrepancies were traceable to the software's assumption that the taxpayer was reading, understanding, and closely following the Internal Revenue Service instructions that come with Form 1040 or some more detailed source, such as the IRS's perennial bestseller, *Your Federal Income Tax*.

Take a simple example. The tax law allows a credit for political contributions up to \$50 on a single return or \$100 on a joint return. Three of the four programs accepted a \$600 entry for this item without a murmur. Where such questionable treatment cropped up, calls to the software's manufacturers brought forth promises such as "The final 1986 release will solve those

limitations." Time will tell.

During my second and third trials, I entered only correct amounts and didn't rely on the program to warn of some abyss I was about to step into. The programs were comparable but not identical in most of their computations. Inevitably, there were some differences in such areas as the alternative minimum tax. Some programs expected me to make my own decisions about what deductions are considered preference income that goes into the calculation. Others made a preliminary decision for me by carrying over some entries from other forms and schedules, while allowing an override if I insisted.

**ORGANIZING IT ALL** All the programs have the Form 1040 in common as the central organizing document. As you put together any federal tax return, you discover that all the other forms and schedules ultimately are reflected on a line of the 1040. Sometimes you must fill out and file other documents along with the 1040. Sometimes filing supporting forms is optional, but filling them out is worthwhile to be sure you have calculated the formulas correctly before you carry the amount back to the 1040. Filing an optional form as backup may even forestall an audit on an unusual item.

The tricky part comes when a required

# Diary of an

I traded my 16K machine and all those disks for Lotus® 1-2-3 and 256K. And immediately got the urge to merge. I started by merging regional statements in Maine. But before I could get to Iowa, I ran out of gas.

At 512K, I discovered what the coordinates IV169 looked like. I was so far out there it felt like I was walking on the moon. It didn't take long to find out 512K was nothing more than a walk around the block.

640K! Loads of space until I fell in love with integrated software and was back to cutting up files again. Sure, the other functions make my worksheet more persuasive, but I'm back to slugging in and out disks. Shades of 16K.



Old war stories of how you fought your way up through the memory ranks are great to remember as long as you don't have to relive them. And you don't.

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Above Board PS has the parallel and serial ports, clock, print buffer, and RAM disk you'd expect from a conventional multifunction board.

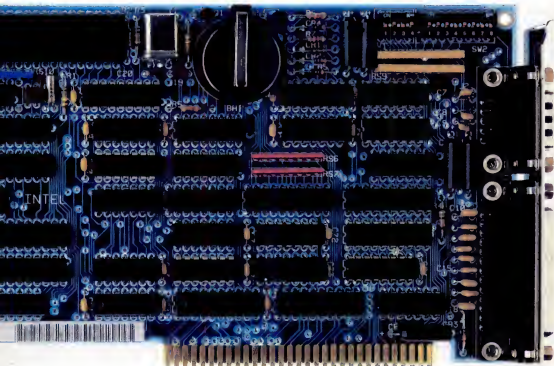
But why buy a conventional board when Above Board PS can take you from 256K all the way to 1.5 megabytes in one fell swoop, without even pausing for a breath at 640K.

So you don't need to hot-wire your way to the top anymore. With Above Board PS, the split worksheet is history. The new norm is windowing, pop-ups, and



# overachiever.

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## ■ TAX PROGRAMS

form, such as a Schedule A for itemized deductions, uses a number from the 1040 (adjusted gross income from line 33) to figure the amount of an allowable deduction (only the part of some medical ex-

penses that are over 5 percent of adjusted gross income are deductible) that goes back onto the 1040 (at line 34). Since these are interrelated calculations, you have to work up to line 33 on the 1040 before you

can do a Schedule A. Then you have to set aside the 1040 and finish Schedule A before you can do lines 34a and b of the 1040 and move on.

One good thing the software packages do is help you coordinate this jumping back and forth. For the most part, they accomplish this by starting with basic information: they have you identify yourself, your filing status, and your exemptions and recite withholdings and previous years' items that might affect this year's calculations. After that, the program may take you through the 1040 line by line or give you the option of hopping around. It's simplest to take the 1040 route, since most of the programs we reviewed give you a chance to stop at any point in the 1040 and go to the supporting schedule or form needed at that point.

**HARD COPIES** Printout time is the moment of truth for the Form 1040. The IRS is adamant about accepting only its own printed Form 1040 or one of the few authorized reproductions. One of those few is generated by the *Digitax 1040* special driver that reproduces an approved Form 1040 on laser printers. With the other programs reviewed here, you can try to coax your printer into typing the numbers into the right blocks on a real or authorized Form 1040. The four programs we reviewed all have the capacity to print on Form 1040. Some of the programs include officially sanctioned transparent overlays of the forms that you align over a plain-paper printout and then photocopy. When all else fails, you transcribe the numbers to the Form 1040 by hand. For all the other forms and schedules, the IRS accepts appropriate computer printouts on lined paper or on plain paper where the computer has provided the necessary lines. All of these programs produce what appear to be acceptable versions of these forms.

### ACCUTAX

*AccuTax* was developed last year and is being offered widely as shareware for the first time this year. The program is available freely through public-domain channels, along with the author/publisher's address and a request to send money if you like the program and want to receive updates. *AccuSoft* plans to send *AccuTax* to

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NO Leading/Trailing Program/Modules during data input. Payroll, Client, and General Expense items entered from same screen. Entry of Period ID Code in Description field translates screen for Payroll entries. Payroll Data entered ONCE for both Payroll Reports and General Ledger Accumulations. NEW Accounts or NEW Employees can be added to files during data entry without changing modules. Entry of Vendor/Supplier ID Code in Description field displays Description you have set up for expenses paid to Vendor/Supplier. Frequent Vendors, Items Alpha Reprints. Check Number increments automatically if desired. Account number description and date will remain if desired. Debit/Credit as well as last 30 minutes displayed on screen during data entry. **BOOKS** Sequential Forward Entry routine allows accountant to set up a sequence of pre-determined accounts that prompts operator for amounts Useful for certain types of businesses using daily reports. System includes automatic Report Pricing feature. Select the Reports to be printed and quantities and system does the printing while operator performs other duties.

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Complete Package (A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z, AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK, AL, AM, AN, AO, AP, AQ, AR, AS, AT, AU, AV, AW, AX, AY, AZ, BA, BB, BC, BD, BE, BF, BG, BH, BI, BJ, BK, BL, BM, BN, BO, BP, BQ, BR, BS, BT, BU, BV, BW, BX, BY, BZ, CA, CB, CC, CD, CE, CF, CG, CH, CI, CJ, CK, CL, CM, CN, CO, CP, CQ, CR, CS, CT, CU, CV, CW, CX, CY, CZ, DA, DB, DC, DD, DE, DF, DG, DH, DI, DJ, DK, DL, DM, DN, DO, DP, DQ, DR, DS, DT, DU, DV, DW, DX, DY, DZ, EA, EB, EC, ED, EE, EF, EG, EH, EI, EJ, EK, EL, EM, EN, EO, EP, EQ, ER, ES, ET, EU, EV, EW, EX, EY, EZ, FA, FB, FC, FD, FE, FF, FG, FH, FI, FJ, FK, FL, FM, FN, FO, FP, FQ, FR, FS, FT, FU, FV, FW, FX, FY, FZ, GA, GB, GC, GD, GE, GF, GG, GH, GI, GJ, GK, GL, GM, GN, GO, GP, GQ, GR, GS, GT, GU, GV, GW, GX, GY, GZ, HA, HB, HC, HD, HE, HF, HG, HH, HI, HJ, HK, HL, HM, HN, HO, HP, HQ, HR, HS, HT, HU, HV, HW, HX, HY, HZ, IA, IB, IC, ID, IE, IF, IG, IH, II, IJ, IK, IL, IM, IN, IO, IP, IQ, IR, IS, IT, IU, IV, IW, IX, IY, IZ, JA, JB, JC, JD, JE, JF, JG, JH, JI, JJ, JK, JL, JM, JN, JO, JP, JQ, JR, JS, JT, JU, JV, JW, JX, JY, JZ, KA, KB, KC, KD, KE, KF, KG, KH, KI, KJ, KK, KL, KM, KN, KO, KP, KQ, KR, KS, KT, KU, KV, KW, KX, KY, KZ, LA, LB, LC, LD, LE, LF, LG, LH, LI, LJ, LK, LL, LM, LN, LO, LP, LQ, LR, LS, LT, LU, LV, LW, LX, LY, LZ, MA, MB, MC, MD, ME, MF, MG, MH, MI, MJ, MK, ML, MM, MN, MO, MP, MQ, MR, MS, MT, MU, MV, MW, MX, MY, MZ, NA, NB, NC, ND, NE, NF, NG, NH, NI, NJ, NK, NL, NM, NN, NO, NP, NQ, NR, NS, NT, NU, NV, NW, NX, NY, NZ, OA, OB, OC, OD, OE, OF, OG, OH, OI, OJ, OK, OL, OM, ON, OO, OP, OQ, OR, OS, OT, OU, OV, OW, OX, OY, OZ, PA, PB, PC, PD, PE, PF, PG, PH, PI, PJ, PK, PL, PM, PN, PO, PP, PQ, PR, PS, PT, PU, PV, PW, PX, PY, PZ, QA, QB, QC, QD, QE, QF, QG, QH, QI, QJ, QK, QL, QM, QN, QO, QP, QQ, QR, QS, QT, QU, QV, QW, QX, QY, QZ, RA, RB, RC, RD, RE, RF, RG, RH, RI, RJ, RK, RL, RM, RN, RO, RP, RQ, RR, RS, RT, RU, RV, RW, RX, RY, RZ, SA, SB, SC, SD, SE, SF, SG, SH, SI, SJ, SK, SL, SM, SN, SO, SP, SQ, SR, SS, ST, SU, SV, SW, SX, SY, SZ, TA, TB, TC, TD, TE, TF, TG, TH, TI, TJ, TK, TL, TM, TN, TO, TP, TQ, TR, TS, TT, TU, TV, TW, TX, TY, TZ, UA, UB, UC, UD, UE, UF, UG, UH, UI, UJ, UK, UL, UM, UN, UO, UP, UQ, UR, US, UT, UU, UV, UW, UX, UY, UZ, VA, VB, VC, VD, VE, VF, VG, VH, VI, VJ, VK, VL, VM, VN, VO, VP, VQ, VR, VS, VT, VU, VV, VW, VX, VY, VZ, WA, WB, WC, WD, WE, WF, WG, WH, WI, WJ, WK, WL, WM, WN, WO, WP, WQ, WR, WS, WT, WU, WV, WW, WX, WY, WZ, XA, XB, XC, XD, XE, XF, XG, XH, XI, XJ, XK, XL, XM, XN, XO, XP, XQ, XR, XS, XT, XU, XV, XW, XX, XY, XZ, YA, YB, YC, YD, YE, YF, YG, YH, YI, YJ, YK, YL, YM, YN, YO, YP, YQ, YR, YS, YT, YU, YV, YW, YX, YZ, ZA, ZB, ZC, ZD, ZE, ZF, ZG, ZH, ZI, ZJ, ZK, ZL, ZM, ZN, ZO, ZP, ZQ, ZR, ZS, ZT, ZU, ZV, ZW, ZX, ZY, ZZ.

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

some 200 user groups around the country for the groups to copy for their members. This distribution will give virtually anybody a chance to look the program over, run through it without putting any cash on the line, and then decide if it's worth sending along the \$35. If you use it and don't send money, only your own conscience will dun you.

If you have serious doubts that any tax program can do the job or is worth its asking price, I recommend you try *AccuTax* before reverting to pencil and hand-held calculator. It does only 15 of the most common forms and schedules, and a dozen worksheets for the federal 1040, but for an individual taking on just one or a few not-too-fancy returns, this is a perfectly adequate program. The documentation, some 48 pages' worth, comes in a disk file that you can read on screen or print out for later reference as you work.

The 311K-byte version we saw fits on one disk along with *COMMAND.COM*. The program revs up with the command *TAX85* and opens with a series of three menus that let you designate a drive for storing data, open a file, and generate input screens that lead you into Form 1040.

*AccuTax* makes extensive use of function keys; available functions are always on display at the bottom of the screen. As you work your way down the 1040 line by line, you can use F6 to call up any other schedule or form that supports the line the

cursor is on. After you've filled in the supporting schedule, F10 will take you back to the form you were on before, automatically carrying the result from the supporting schedule back to its proper place. Say you

are in the 1040 at line 33. F6 takes you to Schedule A, where you list your itemized deductions, and F10 carries the result back to line 34a of the 1040 form.

Calculations are done automatically as

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MAGAZINE**

**FACT FILE**



**AccuTax**  
AccuSoft  
P.O. Box 16706  
Kansas City, MO 64133  
(816) 241-0014  
List Price: \$35 (\$35 annual  
update fee)

**Requires:** 192K RAM, two disk drives or  
hard disk, DOS 2.0

**Prepares:** Form 1040, Schedules A, B, C, D,  
E, G, R, SE, and W plus Forms 2106, 2441,  
4562, 5695, 6251

**In Short:** A cheap software alternative to the  
pencil and hand-held calculator. Handles a  
limited number of forms but covers the basics  
well.

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## TAX PROGRAMS

you go, or you can force a recalculation with the touch of F4 after you've done some editing. The F9 key lets you override the *AccuTax* calculation. If you need to override a whole supporting document,

use the F8 key to list the forms and schedules you've used, then delete the one you want to override. To let you know where you stand as you move along, *AccuTax* has running totals of income and tax that hover

near the bottom of the screen and change almost instantly as you make each new entry that affects them.

The program lets you put up to 50 different returns on a separate disk and then review and edit on-screen as a final check before printing. You can print whole files or specific forms or schedules within a return file.

### TURBOTAX

One of last year's deservedly successful debuts, *TurboTax* at \$65 has a very high cost-performance ratio. The enhanced, but not yet final, copy that we saw, with 30 forms and schedules, fits on one disk.

True to its name, *TurboTax* runs very fast; new screens appear promptly at the press of PgUp or PgDn or scroll seamlessly when you push the cursor past the upper or lower edge of a screen with a cursor key. It doesn't use the function keys but works efficiently from several layers of menus that pop up in windows when you press the Slash (/) key.

The program starts you with its own format for inputting basic identifying data. After that, you can go directly to any form or schedule listed on the forms menu in the window. Alternatively, you can work from Form 1040 and go to the supporting documents only when a line on the 1040

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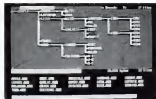
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PC  
MINUTES

## FACT FILE



### TurboTax

ChipSoft Inc.  
5674 Honors Dr.  
San Diego, CA 92122  
(619) 453-8722  
List Price: \$65 (\$32.50 annual update fee)

**Requires:** 256K RAM,

one disk drive or hard disk, DOS 2.0 or later  
**Prepares:** Form 1040, Schedules A, B, C, D, E, F, G, R, SE, and W plus Forms 2106, 2119, 2210, 2441, 3468, 3903, 4136, 4255, 4562, 4684, 4797, 4952, 4972, 5695, 6251, 6252, state forms for AZ, AL, CA, CO, GA, IL, IN, KS, LA, MD, MA, MI, MN, MT, NE, NJ, NY, NC, OH, OK, OR, PA, SC, VA, WI

In Short: Speedy pop-up windows and a high cost/performance ratio make this a successful entry.

CIRCLE 478 ON READER SERVICE CARD

calls for separate data or calculations. Whichever way you prefer to work, the *TurboTax* menu window lets you shift around to any form at any point just by pressing the Slash key. The windowed menu lets you keep the previous form in partial view while you make your next selection. After you've used a form or schedule, its title appears in boldface in the forms menu. I found it nice to be able to see at a glance what ground I had already covered.

If a line isn't supported by an IRS form or schedule, a *TurboTax* feature called "eXpand" will create a blank worksheet on which you can add up a list and carry the total back to the form. Initial entries are totaled as you go; after making any change, you can recalculate instantly. Setting the program to automatically recalculate after every change slows things down a bit, but not perceptibly.

If you want to look at a few checkpoints as you are coming down the home stretch, ten critical figures from the active file's 1040 will appear when you ask the main menu for the tax window. If you'd like to do a separate round of tax planning, the *TurboTax* forms menu has a "tax alternatives" worksheet with rows that track key lines from the 1040 and Schedule A and four blank columns to fill in your own what ifs and compare.

My only quibble with *TurboTax* is its balky data-filing system. Because I was working with the personal version of *TurboTax*, I thought at first that the program would hold data for only one return at a time and that trying to use a second data file would wipe out the first. A creative reading of the instructions reveals that you can keep data files for more than one tax return by switching names on files in drive B: (the operation seemed perilous to me), or by putting each return on a separate floppy disk.

The professional version of *TurboTax* (list price \$495, with discounts to \$195), which we did not see, promises a database manager for client files—presumably a more reassuring way to handle multiple returns. It also promises an optional laser printer driver for the 1040, client letters and interview sheets, and more forms (including Forms 1116, 3800, 4137, 4835, 4970, 5884, and 6478).

**TAX PREPARER**

HowardSoft's *Tax Preparer* is the great-granddaddy of tax preparation programs. This compact package claims over 20,000 users this past year, more than any other

tax program that runs on a microcomputer. Half-a-dozen years of feedback from all those users has helped.

The manual is one of the few I've encountered that appears to be written by

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## ■ TAX PROGRAMS

### DEDUCTING THE COST OF FIGURING THE DEDUCTIONS

*Can you deduct the cost of a tax package and computer on your return? That depends—here's a few guidelines for getting some bucks back from the IRS.*

**P**eople who buy software to do their own tax returns generally are entitled to take the expense as an itemized deduction on line 21 of Schedule A to the Form 1040. The tax code allows this deduction as a cost of determining taxes. It applies whether or not you are in business or hold investments, but you must itemize personal deductions.

Deducting the cost of the computer itself is a different story. The computer you own for solely personal use—games, recipes, and most education—is not deductible. If you use the computer for a combination of personal and business or investment tasks, only the proportion of the computer's cost attributed to business or income-producing uses can be recovered under the rules.

The tax benefits for a computer used more than 50 percent for trade or business are more generous. Assume you bought a computer and put it to use exclusively in your business during 1985. Up to \$5,000 of the cost may be taken in 1985 as a special deduction under Section 179 of the Internal Revenue Code. Anything over \$5,000 you can depreci-

ate. Or you may choose to take an investment credit for 10 percent of the cost and depreciate 95 percent of the cost over 5 years under the accelerated cost recovery system (ACRS).

If you use the computer to manage your investments, you are not entitled to either the investment credit or the \$5,000 Section 179 deduction and generally are limited to straight-line depreciation over a 12-year period. Proving how much of a computer's use is for business or investment purposes will require substantial written records as of next year, but you may base your 1985 tax return deductions on any reasonably persuasive records you have.

A final caveat: If you take the special \$5,000 deduction, an investment credit, or accelerated depreciation and then turn your computer out to pasture before the end of the period on which those deductions were based, you face a terrible consequence called recapture. Recapture means you show the prior tax benefits as taxable income in the year the computer retired from earning its keep.

—Laura Lou Meadows

someone whose first language is English rather than Tekknohilia. It not only gives clear answers on running the software but also has a segment on forms that includes helpful comments on the tax points that come up in the course of filling in forms.

Of the programs reviewed here, only HowardSoft's *Tax Preparer* combines an easy-does-it, on-screen individual return mode and a high-volume professional accountant's keep-it-moving batch processing mode in one \$295 package.

From the opening menus, you check the program settings, set up the storage disk, and choose either the professional's

high-volume mode that calculates later or the individual's format that shows each line of the form or schedule on the screen and calculates as you go.

In the individual on-screen mode, start with Form 1040 as your roadmap. The F10 key brings up the right supporting schedule, form, or worksheet at any line along the way. After you finish calculating a supporting document, the Esc key takes you back to the 1040, where the result appears on the proper line. If you prefer to tackle supporting schedules first, they are also accessible from the main menu. Regardless of where you start, the program eventually

# What to do after you've tried banging on the PC and yelling 'I know you're in there.'

carries all the numbers from the supporting documents back to the 1040.

In case you need tangible proof that the machine is massaging your numbers as it should before you reach the grand finale, the quick-print feature (F6) will crank out the form you have on the screen at the moment. This feature is better than using the Shift-PrtSc key combination because it prints the whole page even if the page doesn't fit on the screen.

Speed has not been HowardSoft's strong suit in the past. Working with an October 1985 reviewer's copy written in BASIC, I concluded that on this score, *Tax Preparer's* bad rep isn't a bum rap. It's sure but slow. Very slow. If you're a professional preparer, speed will matter to you. If you're an individual grinding through a tax return once a year—15 seconds here, 80 seconds there—program speed is the least of your worries. During a call to the HowardSoft office, I was told that much of the program has been rewritten in assembly language and the spring 1986 version will run five times faster.

The professional features include a set of input sheets that you can print and photocopy for the collection of new client data. Where you have last year's data for a client already on a disk in a *Tax Preparer* file, you can print pro forma input sheets with last year's actual numbers and a blank space for this year's amount. You can feed

Let's face it. Human beings have a tendency to lose things. Socks. Car keys. Data. Losing your data has got to be the absolute worst.

By now, you've probably heard of The Norton Utilities™ with UnErase, a program that actually searches for and retrieves erased or deleted data. UnErase has made The Norton Utilities into a legend. But some of our other utilities are just as useful when it comes to organizing and tracking down your data.

## ACCOUNTS RETRIEVABLE

Sometimes files aren't altogether lost, just *misplaced*. Like: "Where did I put that cost analysis I wrote for the Harris Company last year?" If you know the name of the file, punch up FF, the File Find utility. FF will search your directories and display your file by name.

Text Search will search for specific text if you can remember some identifying words of the file. TS even searches erased file space. If you have input data on a faulty part of your disk,

the Disk Test utility DT will report any sectors that are damaged.

And UnErase is always there if you truly have lost your file. If your data is anywhere to be found, UnErase will bring it back.



Got a jumble of loose ends? Other utilities sort through your directories and list them five different ways. You can also gauge file space, wipe files clean and protect your data from accidental deletion.

The Norton Utilities version 3.0 is designed for the IBM PC, PC-AT, and DOS compatibles. Available at Computerland and most software dealers. Order direct for \$99.95 from Peter Norton, 2210 Wilshire Boulevard, Santa Monica, CA 90403. 213-399-3948. Visa and Mastercard welcome.

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## PC MAGAZINE FACT FILE



### Tax Preparer

HowardSoft  
1224 Prospect St., #150  
La Jolla, CA 92037  
(619) 454-0121

Price: \$295 (annual update  
fee "under \$100")

Requires: 128K RAM,

one disk drive or hard disk, DOS 2.0 or later,  
BASIC.

Prepares Form 1040, Schedules A, B, C, D,  
E, F, G, R, SE, and W plus Forms 2106,  
2119, 2210, 2441, 3468, 3903, 4562, 4797,  
5695, 6251, CA state forms.

In Short: The combination of personal and  
professional modes is one factor that has made  
this slow but steady program a perennial hit.

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## ■ FAX PROGRAMS

in data handwritten on input sheets during a client interview by reference number (using hash totals) or onto a truncated facsimile of the form or schedule and do the calculations later in a batch.

## DIGITAX

*Digitax 1040* is our entry in the big-budget-be-hemoth category. The price tag says professional, starting at \$1,650 and moving up from there as you add state modules; and the performance matches. To make *Digitax* show its stuff, try the \$995 driver that makes your laser printer draw a replica of the printed tax forms, including the Form 1040, while it puts in the numbers to look like typing.

*Digitax* not only requires a hard disk; it gobbles up nearly 4 megabytes for the federal program and several more megabytes as you begin to add state programs. What do you get for the megabytes and megabucks? Easier, no. Faster, perhaps. More, yes. Better, definitely.

*Digitax* prepares virtually all federal forms and schedules (over 40, about twice as many as the other programs reviewed here) and has modules available for 11 states that will pick up information from the federal input. It will consolidate returns with extended calculations.

For example, if you've invested in 37 oil and gas shelters or collected 58 separate rental properties, *Digitax* will consolidate the data from 37 partnership Forms K-1 or the 58 rental properties and their depreciation schedules, then carry it to the proper places. *Digitax* makes good use of the function keys and has on-screen help messages about substantive tax points, but it assumes there's a tax professional at the controls. It is designed to be used with input sheets or pro form organizers and has the features expected in a professional program such as client letters and a variety of printing options.

The trial scenario I ran demonstrated that *Digitax* has a very sophisticated and thorough integration of tax concepts and calculations. Most limitations and exceptions in the tax rules are built into the program and figured automatically. In other words, it catches subtle or arcane mistakes that smaller programs don't purport to address.

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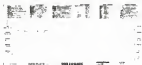
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## TAX PROGRAMS

quirements, *Digitax* is not for everybody. But if you are looking for a program with good user support to take the place of an outside mainframe tax service, *Digitax 1040* is a worthy candidate.

**WHO'S WATCHING THE PROGRAMMER?** After reading the disclaimers that come with tax return programs, you may wonder if Uncle Sam can hold anybody responsible for the results. In December 1985, the Internal Revenue Service cranked out Revenue Ruling 85-189, one of its carefully worded efforts to keep the software writers on their toes. The rule is, if the software purports to include "substantive tax instructions in the computer program" amounting to more than "mere mechanical assistance," then the author/publisher is the equivalent of a tax return preparer.

The revenue ruling gives an example of a programmer who didn't update the depreciation formulas in his 1982 program to take account of a 1983 change in the law. The conclusion is a classic example of IRS doublespeak: If the results turn out to be wrong, the tax return preparer could be liable for each wrong return, with penalties running from \$100 for negligence to \$500

for willful disregard of the rules. However, the IRS concluded that although the software author/publisher is a tax return preparer, it isn't liable for a penalty because it was not involved in actually preparing the return in question.

Of course, you the taxpayer still owe any additional tax when the IRS finds an error, plus any interest for the period the tax was due but not paid. But you will owe no penalty if you or the computer make an innocent mistake.

**THE CRITICS' CHOICE** If you don't mind printing your own manual, or your idea of fun is to see if you can dope out how a program operates without bothering with the manual, hunt down a free copy of *AccuTax*. You may be so surprised at its usefulness that you'll be pleased to send \$35 to the noble souls who put it together.

If your tax situation calls for a few more forms and schedules and you want a sleek, fast program that comes with a reasonable manual and has a year behind it to shake out bugs, *TurboTax* is the low-cost, high-performance choice.

If you want a good, solid, time-tested program with a manual that spells out all its operations, *HowardSoft's Tax Preparer* delivers. It's the least-expensive program around that has both a simple individual on-screen tax-return-preparation mode and a batch-processing mode suitable for the tax professional. But figure out your own needs before buying to see if *Tax Preparer's* relatively limited number of forms and schedules will suffice.

If you have a large tax return business and you are accustomed to sending data input sheets out to a computer service bureau for calculation and printing, you can consider bringing the whole operation in-house with *Digitax 1040*, a hard disk, and a new laser printer. *Digitax's* wide array of federal tax return forms, fully integrated with tax returns for most states, can save you processing fees and turnaround time while still offering your clients a first-class, sophisticated service. ■

*Laura Lou Meadows is a tax lawyer practicing in New York City. She was assisted on this project by coordinating editor Greg Pastrick and editorial assistant Paul M. Stafford.*



## FACT FILE



### Digitax 1040

Digitax Inc.  
179-D School St.  
Westbury, NY 11590  
(800) 344-4829  
(516) 334-0262  
List Price: \$1,650  
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**Requires:** 256K RAM, hard disk with minimum 4 megabytes of RAM, DOS 2.0 or later.  
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4 BRUGATT	90ms	\$495	\$460
5 SEAGATE ST-225	85ms	\$590	\$440
6 TANDON TM-503	80ms	\$599	\$460
7 MINISCINE shock mounted	68ms	\$709	\$564
<b>20MB full height</b>			
8 RODINE 10-202E	85ms	\$853	\$683
9 SEAGATE ST-4026	36ms	\$853	\$684
<b>30MB full height</b>			
10 SEAGATE ST-4038	36ms	\$991	\$822
11 CDC 3415-336	30ms	\$1252	\$999
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12 RODINE 204E	55ms	\$1650	\$930
13 SEAGATE ST-4051	36ms	\$975	
14 MINISCINE M5553	28ms	\$1450	\$826
<b>70MB full height</b>			
15 CDC 3415-586	35ms	\$1800	\$1550

All drives include mounting hardware, cables, and instructions. PC XT, COMPAG Kits include control card. AT Kits including mounting hardware and cable. Choose from controllers XERC, WESTERN DIGITAL, CMI, ETC, ADAPTEC and FALCON.

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# A MOUSE IN YOUR KEYBOARD



*With KBM.COM you don't have to put up with the PC's slow cursor movement. This program makes the numeric keypad act like a rapid rodent.*

The IBM PC keyboard is a programmer's dream. Its beauty is that it does almost nothing: The system software decides what each keystroke means. Thus, with some custom programming, you can redefine the meaning of any keystroke—and that's only the beginning. In this article, I'll show you how to create a keyboard driver that works as a mouselike interface, simplifying some programming tasks on the PC.

When you write arcade-style games or screen graphics software, you must always supply a keyboard interface for those users who don't own a joystick or a mouse. Two common programming techniques are used. First, you can start moving the pointer (or gunship or Pacman) upon an initial keystroke and then halt or change its direction with a different keystroke. This method is used in such popular games as *Space Strike*, *Cosmic Invaders*, and *Crossfire*, but it's awkward and anti-intuitive. The alternative is to rely on the keyboard's typematic (repeat-key) mechanism. That is, you have the pointer move a single step at each automatic repeat of the keystroke. This is how *Top View* simulates its keyboard mouse, for example. Unfortunately, however, the keyboard's typematic response time is poor, so the pointer motion is slow (one column or line per repeat) or jumpy (several increments per repeat).

The ideal interface would sense the exact moment a key is pressed and would continue to act on that keystroke until the exact moment it's released. The keyboard sends a signal to the PC whenever a key is pressed, and it follows up with another sig-

nal when the key is released, so it has the basic capability needed for just this type of interface.

The PC's BIOS simply ignores most of the key-release signals. But the BIOS does track the release of certain keys to monitor the status of the various Shift keys. It sets and resets bits of a keyboard variable according to whether or not a Shift key (Alpha-Shift, Ctrl, and Alt) is currently being pressed. Therefore, a program can determine which of the Shift keys are being held down on a real-time basis.

You can see what the BIOS sees as it monitors the keyboard's shift status if you enter and run the following short BASIC program:

```
10 DEF SEG = 0
20 LOCATE 1,1
30 PRINT PEEK(&H417) AND 15;
40 GOTO 20
```

At first, you will see a 0 displayed in the top left corner of your screen. But when you press the Ctrl key, the value displayed immediately changes to 4. Release the Ctrl key, and it changes back to 0. Pressing the Alt key results in an 8 being shown. The two Alpha-Shift keys display different values: left Shift shows a 1, and the right Shift key, a 2.

Now here's the intriguing part. When you press both Ctrl and Alt at the same time, the display shows a 12—the combined values of 4 and 8. Thus, by testing the bit values of the BIOS Shift-key status variable, you can not only determine which of the four individual shift keys is being pressed but you can also test for

them in any combination.

See the potential? If you could modify the BIOS so that it used this Shift-key technique to monitor the Cursor keys, you'd be able to know exactly when the user was pressing a Cursor key and exactly when the key was released. What's more, you could determine if two or more keys were being pressed at the same time. For example, you'd know when the user wanted to move the pointer to the right, and you could also tell if the user wanted to move up and right at the same time.

## THE KEYBOARD INTERRUPT

Whenever a key is pressed or released, the keyboard generates an interrupt to tell the 8088 CPU to process the keystroke. To modify the way the PC's keyboard normally acts, you must intercept the keyboard interrupt and process each keystroke in a different way. If you look through the BIOS listing in the *PC Technical Reference* manual, however, you'll quickly realize that the keyboard interrupt handler is an enormously complicated program. A complete rewrite would be a difficult task for even the most experienced assembly language programmers.

Fortunately, there is an alternative. Instead of rewriting it, you can install a *front end*, that is, a short program that intercepts each keystroke, takes some action, then passes control right back to the normal PC BIOS keyboard interrupt handler.

This front-end concept is the basis of KBM.COM, the source code for which is shown in Figure 1. The program installs itself permanently in memory and sets the

keyboard interrupt vector so that control will be routed to its own keyboard handler each time the keyboard sends a signal to the CPU. Most keystrokes are passed straight through the new driver and return to the original keyboard handler, where they are processed in the normal manner. But selected keys are processed separately. These keys, which include the Cursor keys and several others, cause bit flags to be set and reset in much the same way as the BIOS sets and resets the bits of the Shift-key status variable. *[Note: As frequently happens with memory-resident programs that intercept the keyboard interrupt, KBM.COM is not compatible with all programs. One example of this problem arose when we tried to run Borland International's SideKick—Ed.]*

The comments at the beginning of Figure 1 show the bit pattern that is established by the KBM keyboard handler. The bit flags are stored in the byte at 0000:04F0. This is in an area that the BIOS calls the "interapplication communication area," so it should be a safe address for keyboard information.

As you can see from the listing, the Cursor keys occupy the first 4 of the 8 bits in the byte. Three of the upper 4 bits correspond to the buttons on my keyboard "mouse." After some experimentation, I found the Home, PgUp, and the gray Minus keys were excellent mouse buttons (the gray Minus key is positioned just to the right of PgUp on the numeric keypad). Personally, I also found it easier to press the 5 on the numeric keypad than to press the Down Cursor key; to preserve the conventional option, both of these keys are programmed to mean "move down."

The high bit echoes the status of the CapsLock key. If you place your right hand over the numeric keypad, you will find it easy to press CapsLock with your thumb at the same time as you press one or more Cursor keys. I defined this key as the "accelerator" key, so an application can move the pointer faster while it is being pressed. In an arcade-style game, you could use CapsLock to launch missiles or fire torpedoes.

**MOUSING AROUND** The KBM.ASM listing in Figure 1 should be assembled, linked (ignore the "no stack" warning),

```

This program interprets keyboard data and creates a bit pattern determined
according to whether or not certain keys are currently being pressed.

The bit pattern is stored in the "inter-application communication area"
at $B08:$4F9. It is interpreted as:

      7 6 5 4 3 2 1 #   (bit number)
      C m P H L d r u   (bit name)
      | | | | | | | |
      | | | | | | | | +--- bit 0 (#1h) - set = 1 while [up arrow] is pressed
      | | | | | | | | +--- bit 1 (#2h) - set = 1 while [right arrow] is pressed
      | | | | | | | | +--- bit 2 (#4h) - set = 1 while [down arrow] or [5] is pressed
      | | | | | | | | +--- bit 3 (#0h) - set = 1 while [left arrow] is pressed
      | | | | | | | |
      | | | | | | | | +--- bit 4 (10h) - set = 1 while [Home] is pressed
      | | | | | | | | +--- bit 5 (20h) - set = 1 while [PgUp] is pressed
      | | | | | | | | +--- bit 6 (40h) - set = 1 while grey [-] is pressed
      | | | | | | | | +--- bit 7 (80h) - set = 1 while [CapsLock] is pressed

As soon as the key is released, the relevant bit is reset to 0.

The byte at $B08:$4F1 is the "pass-through/filter" mode flag. When this
byte is zero, all keystrokes are passed to the normal keyboard handler.
When it's non-zero, the selected keystrokes are filtered (diebeefed for
normal input). BIDS and DESD keyboard cells will not recognise them.

The Alt-NumLock keystroke toggles between pass-through and filter modes.

This program is installed and remains resident. It is a COM-format
file, so it must be converted with EXE2BIN.

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;= equates ======

KB_DATA_PORT    equ     60h ;These are listed in the PC and XT
KB_CTRL_PORT    equ     61h ; Technical Reference Manuals

KB_FLAG        equ     417h ; the BIOS shift-key status (in segment #)
ALT_STATE       equ     8   ; Bit pattern while the [Alt] key is pressed
NUMLOCK_KEY     equ     5   ; scan-code of the [Numlock] key

NUT_CTL_PORT    equ     28h ; Interrupt controller port (8259 chip)
ENDI            equ     29h ; End-of-Interrupt code sent to 8259

RELEASE_BIT     equ     80h ;also called the "break" bits: s key was released

KEY_FLAGS       equ     $4F0H ;the address of the key bit flags (segment #)
NMFL_FLAG       equ     $4F1H ;when 0, all keys are passed to normal kbint
INST_FLAG       equ     $4F2H ;set to 1234H during installation

com_seg         segment
assume          cs:com_seg, ds:com_seg
org             100h ;must leave for COM-format program
kbm             proc
                set_up ;get past data and install interrupt hender
                jmp     end

;===== program data area =====

norm_kbd_int    label dword ;type DWORD so it can be used in a FAR jump
nkl_offset      dw 0        ; This address is stored in the SET_UP proc
nkl_segment     dw 0        ; It's the address of the previous kbint routine

;-----
; KBID_INT
; 1) reed the keyboard
; 2) eet/reset bits in mouse movement byte
; 3) execute normal keyboard interrupt
;-----
               ecen bit key suggested meaning
               code flag name (defined by user)
;-----
kbm_tbl         db 77, 1 , num.pad 8 go up
                 db 77, 2 , num.pad 6 go right
                 db 80, 4 , num.pad 2 go down
                 db 75, 8 , num.pad 4 go left

                 db 76, 4 , num.pad 5 go down
                 db 71, 16 , Home button 1
                 db 73, 32 , PgUp button 2
                 db 74, 64 , grey minus button 3
                 db 58, 128 , CapsLock "high-gear shift" for feet motion

tbl_end         label byte

```

**Figure 1:** The assembly language listing for KBM.COM



```

;-----
; KBD_INT
; This procedure intercepts the ROM-BIOS KB_INT.
; It sets and resets bits of a kbd flag as the user presses and releases keys.
; When the byte at 0000:0421 is 0, the keystroke is passed on to the
; original keyboard handler.

kbd_int proc far
    sti
    cld
    push ax
    push si
    push ds

    in ax,KB_DATA_PORT ;read scan-code from keyboard into AL
    mov sh,al           ;save original byte in AH
    and al,7fh          ;mask off "release bit" for comparisons

    mov si,offset kbm.tbl

k_20:
    cmp si,offset tbl_end ;et end of table?
    je k_25               ; yes, key not found. Exit to normal kbint
    cmp al,byte ptr cs:[si] ; is this the key?
    je k_38               ; yes, process the keystroke
    inc si                 ; no, point past the scan code
    inc si                 ; point past the bit-mask
    jmp k_20               ; end loop back for the next entry

k_25:
;----- check for mode-toggle by user
    cmp oh,MODLOCK_KEY ;is this a press of [NumLock]?
    jne k_27             ; no, go
    sub si,si            ; yes, look to BIOS data area
    mov ds,si
    test byte ptr ds:[KB_FLAG],ALT_STATE ; is [Alt] pressed?
    je k_27              ; no, pass the key on
    xor byte ptr ds:[MODE_FLAG],1 ; yes, toggle the mode and
    jmp short k_exit      ; exit w/o processing

;----- the keystroke is to be processed by the normal keyboard interrupt
k_27:
    pop ds
    pop si
    pop ax
    jmp cs:[norm_kbd_int] ;continue at normal keyboard handler

k_38:
;----- process the scan code into a bit-pattern
    mov al,cs:[si+1] ;get bit-flag mask
    sub si,si
    mov ds,si ;point to segment of KEY_BITS

    test oh,RELEASE_BIT ;is this key being released?
    je k_48 ; no, go

;----- process key release
    not al ;flip-flop mask bits
    and byte ptr ds:[KEY_BITS],al ;mask off released key bit
    jmp k_48

k_48:
;----- process key press
    or byte ptr ds:[KEY_BITS],al ;set the bit for pressed key

;----- determine whether key should be passed on to normal keyboard handler
k_50:
    cmp byte ptr ds:[MODE_FLAG],0 ;should key be processed further?
    je k_27 ; yes, continue at normal kb int

;----- the keystroke is to be ignored by the rest of the system.
; wrap up this keyboard interrupt.

k_exit:
    in ax,KB_CTRL_PORT ;get current value of keyboard control lines
    mov sh,al ; save it
    or al,00h ;set the "enable kbd" bit
    out dx,KB_CTRL_PORT,al ; and write it out the control port
    xchg sh,al ;fetch the original control port value
    out dx,KB_CTRL_PORT,al ; and write it back

    pop ds
    pop si
    cld

```

(Figure 1 continues)

and turned into .COM format with the command

```
EXEBIN kbm kbm.com
```

Rather than type it all in, you can download the listing by modem from *PC Magazine's* free Interactive Reader Service at (212) 696-0360. (The fully assembled KBM.COM is also available through PC-IRS, but your communications software must support the Xmodem protocol to download .COM files.)

As an alternative, you can enter and execute the BASIC program listed in Figure 2. It contains the exhausting series of DATA statements that are the opcode bytes of the KBM.COM program. If you mistype any of the data statements, the program will inform you of the error. This file is also available through PC-IRS. Just download KBM.ASC, RENAME it KBM.BAS, and run it once under BASICA, and you will automatically generate the KBM.COM program.

When you have successfully created the KBM.COM program, simply execute it by entering KBM at the DOS prompt. You should see an installation notice followed by the DOS prompt.

After installing KBM, get into BASIC and try this short program:

```

10 DEF SEG = 0
20 LOCATE 1,1
30 PRINT PEEK(&Hf0); " * ";
40 GOTO 20

```

Try pressing and releasing the cursor keys on the numeric keypad. Then try the Home, PgUp, gray Minus, and CapsLock keys. The screen should respond with a changing value each time you press and release one of these keys. In addition, you will find that the PC begins beeping after a few moments of experimentation. This means that the keyboard buffer is filling up with the keystrokes and the typematic repeats.

KBM solves this keyboard buffer problem by supporting two modes of operation. You have just been experimenting with the default "pass-through" mode. In this mode, all keystrokes—text as well as Cursor keys—are passed to the normal keyboard driver. The alternative is called the "filter" mode. It filters out the key-



## ■ PROGRAMMING/UTILITIES

```

mov     ei,EOI                ;end End-Of-Interrupt signal
out     INT_CTL_PORT,e1      ; to the 8259 Interrupt Controller
pop     ex                    ;exit to interrupted program
kbd_int endp

LAST_BYTE equ    offset $+1   ;This is the address passed to INT 27h
;Notice that the code of the SET_UP
; procedure is not preserved in memory

;-----
; SET_UP
; This routine is executed only once, when the program is installed.
inet_mesg db 'IBM Keyboard Mouse driver',0dh,0ah
db 'Copyright (c) 1986 Biff-Devis Publishing Co.,',0dh,0ah,'$'
err_mesg1 db 07h,'Already installed',0dh,0ah,'$'
err_mesg2 db 'Wrong DOS version.',0dh,0ah,'$'
set_up   proc    near
;----- make sure this is DOS 2.0 or later
mov     ch,30h
int     21h
cmp     al,2
jae     ea,10
mov     dx,offset err_mesg2
jmp     msg_exit
su_10:
;----- see if KBM has already been installed
mov     ax,0
mov     cx,ax
cmp     es:[INST_FLAG],1234h ;already installed?
jne     ea,20
mov     dx,offset err_mesg1 ; yes, exit with message
jmp     msg_exit
su_20:
mov     word ptr es:[INST_FLAG],1234h ; flag says KBM is installed
;----- save the old kbint vector and set up the new one
mov     ei,9
mov     ch,35h ;DOS GET_VECTOR service
int     21h ; for interrupt 9 (KBINT)
mov     ei,9 ;get address of the current kb int handler
mov     ch,35h ;DOS GET_VECTOR service
int     21h
mov     nki_segment,es ;save old address
mov     nki_offset,bx
mov     dx,offset kbd_int ;set INT 9 to local keyboard interceptor
mov     ei,9 ;set vector for INT 9 to DS:DX
mov     ch,25h ;DOS SET_VECTOR service
int     21h
mov     ex,0
mov     byte ptr es:[MODE_FLAG],0 ;initialize variables:
mov     byte ptr es:[KEY_BITS],0 ; process all keystrokes
; no keys are pressed
;----- display message to indicate install'tion complete
mov     dx,offset inet_mesg
mov     ah,9
int     21h
;----- exit to DOS, leaving the interrupt handler resident
mov     dx,LAST_BYTE
int     27h
msg_exit:
mov     ch,9
int     21h
mov     ah,9
int     20h
set_up   endp
endp     msg_exit
end     kbm

```

(Figure 1 ends)

board mouse control keys. All other keys will be processed as expected, but the numeric keypad, the CapsLock, and the gray Minus keys are filtered and will not be

stored into the keyboard buffer.

To enter the filter mode, you POKE a nonzero value into the byte at 0000:04F1. For example, you could change line 10 of

the previous example to

```
10 DEF SEG = 0 : POKE 04F1,1
```

and execute the program. This time, the buffer will not fill up, so the mouse can function without adverse effect on the rest of the system.

This leaves us with a problem. While KBM is in the filter mode, all the KBM keys—including all digits on the numeric keypad—can't be read in the normal way. In fact, if you modify and execute line 10 as shown, you will find that after pressing Ctrl-Break to abort the program, you cannot move the cursor around the screen to edit your program. Now you can enter the command

```
DEF SEG=0 : POKE 04F1,0
```

or you can toggle back into pass-through mode by pressing Alt-NumLock.

Thus, you can either program your application to switch KBM modes at appropriate times, or you can leave it to the user to press Alt-NumLock to toggle back and forth. KBM should be in filter mode while you expect to receive mouse-movement data, and it should be in pass-through mode while you expect to receive normal keystrokes.

Figure 3 illustrates how to use the KBM bit flags in an application program. It sets KBM to filter mode and loops endlessly, adjusting the cursor position according to the status of the KBM bit flags.

Lines 120 through 150 sense the Cursor keys and move the cursor position. When CapsLock is pressed in conjunction with one or more Cursor keys, the cursor is moved in larger steps. Note how the AND function is used in its bitwise logical context. A statement such as

```
IF (K AND 4) THEN . . .
```

is really saying, "If bit 2 of the variable K is set to 1, then . . ." This technique lets us examine the bits of the KBM flag individually.

Lines 180 through 200 sense the status of the "mouse buttons." In this demonstration, the program just beeps a separate tone whenever one of them is pressed. In a real application, of course, you would implement the buttons to select an object, start drawing a line, bring up a menu, or some similar action.

```

100 ' Program for creating A:KBM.COM
110 CLS:PRINT "Checking DATA; please wait..."
120 FOR S=1 TO 23
130 FOR C=1 TO 17
140 READ AS:IF C<17 THEN 160
150 S=S+VAL(AS)
160 NEXT:NEXT
170 IF S=33608 THEN RESTORE:GOTO 200
180 PRINT "ERRADR: CHECK THE LAST NUMBER IN!"
190 PRINT "EACH DATA STATEMENT--THEN REDO":END
200 FOR S=1 TO 23
210 FOR C=1 TO 16
220 READ AS:TTL=TTL+VAL("AS")
230 NEXT
240 READ S:IF S=TTL THEN 270
250 PRINT "DATA ERROR IN LINE"$(S+330)
260 PRINT "CHECK FIGURES AND REDO":END
270 TTL=S:NEXT:RESTORE
280 OPEN "A:KBM.COM" AS #1 LEN=1:FIELD #1, AS D$
290 FOR D=1 TO 23
300 FOR C=1 TO 16
310 READ AS:LSET D$=CHR$(VAL("AS"))
320 PUT #1:NEXT:READ DUMMY$:NEXT:C:D$
330 PRINT "A:KBM.COM CREATED"
340 DATA 29, FE, 00, 00, 00, 00, 40, 01, 4D, 02, 50, 04, 40, 00, 4C, 002
350 DATA 04, 47, 10, 49, 20, 4A, 30, 00, 30, PC, 50, 56, 1E, 04, 60, 1543
360 DATA 0A, 0E, 24, 7F, 0E, 07, 01, 01, FE, 19, 01, 77, 09, 20, 3A, 04, 1360
370 DATA 74, 23, 46, 46, EB, F3, 00, PC, 45, 75, 12, 20, F6, 0E, DE, F6, 2250
380 DATA 06, 17, 04, 08, 74, 07, 00, 36, F1, 04, 01, EB, 29, 17, 5E, 50, 1001
390 DATA 2E, FF, 2E, 03, 01, 2E, 0A, 04, 01, 20, F6, 0E, DE, F6, 04, 00, 1027
400 DATA 74, 09, F6, 0D, 20, 06, F0, 04, 03, 05, 90, 00, 06, F0, 04, 00, 1631
410 DATA 3E, F1, 04, 00, 74, 07, 04, 61, 0A, EB, 0C, 00, 00, 63, 06, 20, 2150
420 DATA 06, 61, 1F, 5E, FA, 00, 20, 06, 20, 50, CF, 40, 42, 20, 20, 1470
430 DATA 40, 65, 79, 42, 0F, 61, 72, 04, 20, 40, 6F, 75, 73, 65, 20, 64, 1470
440 DATA 72, 6E, 6E, 72, 0D, 0A, 43, 6F, 70, 79, 72, 69, 67, 68, 74, 1520
450 DATA 20, 20, 63, 29, 20, 31, 39, 30, 36, 20, 5A, 69, 66, 20, 44, 1004
460 DATA 76, 69, 73, 20, 50, 75, 62, 6C, 69, 73, 60, 69, 66, 67, 20, 1544
470 DATA 63, 6F, 2E, 2C, 00, 0A, 24, 07, 41, 6C, 72, 65, 61, 6A, 79, 20, 1072
480 DATA 69, 65, 73, 74, 61, 6C, 65, 64, 0D, 0A, 24, 57, 72, 6F, 6E, 1441
490 DATA 67, 20, 44, 4F, 53, 20, 76, 65, 72, 73, 69, 6F, 6E, 2E, 0D, 0A, 1250
500 DATA 24, 0A, 30, 21, 3C, 82, 73, 06, 0A, 3C, 01, 20, 57, 90, 00, 1708
510 DATA 00, 0E, 0E, 0C, 26, 81, 3E, F2, 04, 34, 12, 75, 06, 0A, 07, 01, 1404
520 DATA 0B, 43, 00, 26, CF, 06, F2, 04, 34, 12, 00, 00, 0A, 35, CD, 21, 1661
530 DATA 00, 09, 34, 35, CD, 21, 0C, 06, 05, 01, 00, 0E, 03, 01, DA, 19, 1190
540 DATA 01, 00, 09, 04, 25, CD, 21, 00, 00, 00, 0E, 0C, 26, C6, 06, F1, 1644
550 DATA 04, 00, 26, C6, 06, F0, 0A, 00, 0A, 00, 01, 04, 09, CD, 21, 00, 1302
560 DATA 16, 0C, 01, CD, 27, 04, 09, CD, 21, CD, 20, 00, 00, 00, 00, 00, 1071

```

Figure 2: Running this BASIC program will also create KBM.COM.

```

1 ' KBMTEST.BAS by Dan Rollins
2 ' Illustrates how to use the KB Mouse bit flags in an application
3 ' KBM.COM must be executed before running this program
4 DEFINT A-Z
5 DEF SDO=0 ' KEY BITS=4040# (CONT.FLAG=4041: INST.FLAG=4042)
6 IF SEEK(INST.FLAG)+SEEK(INST.FLAG+1)*256 = 40234 GOTO 60
7 BEEP:CLS:PRINT "KBM has not been installed!" :STOP
8 POKE CONT.FLAG,1 ' kb mouse keys will NOT be used as normal keystrokes
9 FOR I=1 TO 12
10 LOCATE I,1,0,15 ' using a large cursor for kb mouse pointer
11 CLS:PRINT "Use arrow keys to move the cursor"
12 PRINT "[Home] [PgUp] and [-] are mouse 'buttons'"
13 PRINT "[F5] [CapsLock] to accelerators"
14 PRINT "[F6] [Esc] to exit the loop"
15 '
16 ' this loop moves the cursor and senses the KBM buttons
17 LOCATE Y,X ' moves cursor to new position
18 IF SEEK(KEY BITS) ' read the bit flags for the kb mouse
19 IF (K AND 1) THEN Y=Y-1 IF (K AND 120) THEN Y=Y+1 ' up, CapsLock
20 IF (K AND 2) THEN X=X-1 IF (K AND 128) THEN X=X+2 ' right, CapsLock
21 IF (K AND 4) THEN Y=Y+1 IF (K AND 120) THEN Y=Y-1 ' down, CapsLock
22 IF (K AND 8) THEN X=X-1 IF (K AND 128) THEN X=X+2 ' left, CapsLock
23 IF X=0 THEN X=80 ELSE IF X=1 THEN X=1 ' sense edge of screen
24 IF Y=24 THEN Y=4 ELSE IF Y=1 THEN Y=1
25 IF (K AND 16) THEN SOUND 200,,0.3 ' button 1 = [Home]
26 IF (K AND 32) THEN SOUND 400,,0.3 ' button 2 = [PgUp]
27 IF (K AND 64) THEN SOUND 600,,0.3 ' button 3 = [-] [gray minus]
28 AS=INKEY$:IF AS=CHR$(27) THEN 300 ' exit loop on [Esc]
29 GOTO 100
30 DEF SDO=0:POKE CONT.FLAG,0 ' reset to normal key processing
31 LOCATE ,,,6,7 ' reset to normal cursor
32 END

```

Figure 3: KBMTEST.BAS demonstrates how KBM.COM sets bit flags that would be used by an applications program.

**SUMMARY** The PC keyboard offers a great deal of flexibility because of its simplicity of design. KBM is a tool for application programs that uses this flexibility to provide a different way to handle selected keystrokes—as a bit pattern modified continuously and simultaneously by pressing or releasing those keys.

This technique is useful in applications that normally rely on a mouse to provide pointer information. The controlling program can get instant information as to the status of the selected keys, and it's able to determine when and if two or more keys are pressed at the same time. The technique can also be used to provide the sort of real-time keyboard status response that is absolutely essential in fast-paced arcade-style games.

While I have used the numeric keypad Cursor keys as the input for a mouse- or joystick-oriented application, you may want to change the layout to suit your own purposes. For instance, you may want to define the Home, PgUp, End, and PgDn keys so they each set and reset two bits of the KBM flags, indicating diagonal movement with a single key. You may also find that other keystrokes make more sense for your application. For instance, in an arcade-style game, you may want to define the A and Z keys for vertical motion and the Semicolon and Quotation mark keys for horizontal motion.

The comments in Figure 1 will help you to modify the KBM program to make it the perfect keyboard tool for your purposes. Remember, though, that KBM is designed to be implemented in applications programs—it is not a standalone program designed to let you zip your cursor around the screen in DOS or with existing, off-the-shelf software. However, though it's beyond the scope of this article, for interested programmers it is only a small step from the code of KBM.ASM to writing a driver that's fully compatible with the Microsoft Mouse, using the same interrupt vectors and parameters. Be creative with KBM and, above all, have fun!

Dan Rollins is a computer consultant and free-lance technical writer. He is the author of IBM PC 8088 MACRO Assembler Programming, published by Macmillan Publishing Company Inc.

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■ EDITED BY JARED TAYLOR

# SPREADSHEET CLINIC



*This forum lets readers exchange the ingenious solutions and timesaving hints that make their spreadsheets and integrated software packages work better.*

## MORE MACRO CHARACTERS FOR 1-2-3

In the Spreadsheet Clinic of October 29 (*PC Magazine*, Volume 4 Number 22), you included an item on adding the tab function to 1-2-3 macros. It involved writing a BASIC program that would write an intermediary file that could be imported into 1-2-3.

As shown in Figure 1, I have written a different BASIC file that adds other useful macro characters, such as Tab Left, and Printer Backspace. It also writes an intermediary file, called ASCIINEW.PRN, that contains the characters and a description of their functions. Import this file with /File Import Numbers, and you'll be able to use the characters in place of macro words like (down) or (calc).

I have not yet found the codes for the F1 key, CapsLock, NumLock, ScrollLock, and Alt, but I'll keep looking.

Jonathan Weidner  
Houston, Texas

*It's amusing and edifying to know, for example, that the ASCII character number 1 (a smiling face) can take the place of the word (up) in a macro. However, since you can't type that character directly from the keyboard, the only way to get it into a macro is to first load ASCIINEW.PRN into a worksheet and then use /Copy to move the smiling face to wherever you want it. That's a lot harder than writing (up).*

Nevertheless, this procedure is the only way I know to put such things as Tab Right, Tab Left, and Beep into a macro, because 1-2-3 left out command words for

those functions. Since the BASIC listing in Figure 1 is fairly long, readers may wish to

copy only those lines that write the characters they need.

```

10 LF2$ = CHR$(23) 'EDIT
20 LF3$ = CHR$(5) 'RANGE
30 LF4$ = CHR$(9) 'ABSOLUTE REFERENCE
40 LF5$ = CHR$(8) 'GOTO
50 LF6$ = CHR$(18) 'WINDOW
60 LF7$ = CHR$(25) 'QUERY
70 LF8$ = CHR$(24) 'TABLE
80 LF9$ = CHR$(17) 'CALC
90 LF10$ = CHR$(14) 'GRAPH
100 LESC$ = CHR$(12) 'ESCAPE
110 LTABRT$ = CHR$(19) 'TAB RIGHT
120 LTABLT$ = CHR$(20) 'TAB LEFT
130 LHOME$ = CHR$(16) 'HOME
140 LEND$ = CHR$(6) 'END
150 LPGUP$ = CHR$(21) 'PAGE-UP
160 LPGDN$ = CHR$(22) 'PAGE-DOWN
170 LDEL$ = CHR$(15) 'DELETE
180 LRIGT$ = CHR$(4) 'RIGHT CURSOR
190 LLEFT$ = CHR$(5) 'LEFT CURSOR
200 LUP$ = CHR$(13) 'UP CURSOR
210 LDOWN$ = CHR$(12) 'DOWN CURSOR
220 LRETURN$ = CHR$(11) 'RETURN
230 LBE$ = CHR$(7) 'BEEP
240 LBLOCK$ = CHR$(127) 'PRINTABLE BLOCK CHARACTER, i.e. printer backspace
250 BS=CHR$(34) 'QUOTES FOR FIELD DEFINITION
260 CS=CHR$(44) 'CURSOR FOR FIELD BREAK
500 OPEN "O:", "ASCIINEW.PRN"
510 PRINT #1, BS+LF2$+BS+CS+BS+ " Z2 EDIT"+BS
520 PRINT #1, BS+LF3$+BS+CS+BS+ " Z3 RANGE"+BS
530 PRINT #1, BS+LF4$+BS+CS+BS+ " Z4 ABSOLUTE REFERENCE"+BS
540 PRINT #1, BS+LF5$+BS+CS+BS+ " Z5 GOTO"+BS
550 PRINT #1, BS+LF6$+BS+CS+BS+ " Z6 WINDOW"+BS
560 PRINT #1, BS+LF7$+BS+CS+BS+ " Z7 QUERY"+BS
570 PRINT #1, BS+LF8$+BS+CS+BS+ " Z8 TABLE"+BS
580 PRINT #1, BS+LF9$+BS+CS+BS+ " Z9 CALC"+BS
590 PRINT #1, BS+LF10$+BS+CS+BS+ " Z10 GRAPH"+BS
600 PRINT #1, BS+LESC$+BS+CS+BS+ " BSCAPE"+BS
610 PRINT #1, BS+LTABRT$+BS+CS+BS+ " TAB RIGHT"+BS
620 PRINT #1, BS+LTABLT$+BS+CS+BS+ " TAB LEFT"+BS
630 PRINT #1, BS+LDEL$+BS+CS+BS+ " BOME"+BS
640 PRINT #1, BS+LRIGT$+BS+CS+BS+ " END"+BS
650 PRINT #1, BS+LUP$+BS+CS+BS+ " PAGE-UP"+BS
660 PRINT #1, BS+LDOWN$+BS+CS+BS+ " PAGE-DOWN"+BS
670 PRINT #1, BS+LDEL$+BS+CS+BS+ " DELETE"+BS
680 PRINT #1, BS+LRIGT$+BS+CS+BS+ " RIGHT CURSOR"+BS
690 PRINT #1, BS+LLEFT$+BS+CS+BS+ " LEFT CURSOR"+BS
700 PRINT #1, BS+LUP$+BS+CS+BS+ " UP CURSOR"+BS
710 PRINT #1, BS+LDOWN$+BS+CS+BS+ " DOWN CURSOR"+BS
720 PRINT #1, BS+LRETURN$+BS+CS+BS+ " RETURN"+BS
730 PRINT #1, BS+LBE$+BS+CS+BS+ " BEEP"+BS
740 PRINT #1, BS+LBLOCK$+BS+CS+BS+ " BLOCK CHARACTER i.e. printer backspace"+BS
750 CLOSE
760 END

```

**Figure 1:** A BASIC program that generates a file called ASCIINEW.PRN for importation into 1-2-3.

## ■ SPREADSHEET CLINIC

### NUMBERS TO LABELS

If you need to change a column of 1-2-3 numeric data into labels, the macro shown in Figure 2 will do the job. When run, it begins by asking for the address of the first cell to process. It then puts a marker at the end of the column. In this case, I've used the number 999, but it can be anything that is different from everything else in the column. The macro adds a label character to the beginning of each number until it finds the marker and ends. If you need to change labels back to numbers, change the fifth line of the macro to read

```
{edit} {home} {del} "
```

David Klages  
DeKalb, Illinois

*And to process a row of data, just change every {down} to {right}.*

### TURNING OFF THE LIGHTS IN SYMPHONY

When you develop a turn-key application using *Symphony*, you may want to modify its screen display. *Symphony*'s constant display of cell references and environment type, for example, is a distraction. Figure 3 shows a macro that will clean up the display and cut off the flashing lights while you run an application.

The trick is to switch to a graphics environment, where the normal *Symphony* indicators aren't displayed, and give the {paneloff} command. Then return to the environment in which you started and continue your application. This example ends with a {?}, which lets you move around the spreadsheet. The indicators will come back on with the first carriage return.

In an applications program you would replace the {?} with either a {return} or a {branch} command to allow further processing. While this example is for a SHEET application, you can use it in any other environment by changing the second {type} command.

Dan Domzalski  
Buffalo Grove, Illinois

### FLOPPY DISK MENUS

When you have a lot of related 1-2-3 files on a disk, it's helpful to have a small index worksheet to keep track of them. The in-

VA	{GOTO}{?}"	Get address of first cell to convert
	/encPINTER{BS}"	Name current cell POINTER
LOOP	{END}{DOWN}{DOWN}999"	Go to end of column, enter marker
	{GOTO}{POINTER}"	Goto POINTER
	{EDIT}{(NAME)"	Add "
	{DOWN}	Move to next cell
	/encPINTER{BS}"	Name current cell POINTER
	/x!POINTER{>999"/x!LOOP"	Test for marker, restart loop
	/re"	Erase marker

Figure 2: A macro that changes numbers into labels.

MACRO NAME	COMMANDS
IND_OFF	{windoweoff} {type}{paneloff}{type}s" {windowe}{?}

Figure 3: A macro that turns off *Symphony* indicators.

A	B	C	D	E	F
3			MOVE THE CURSOR TO		
4	FILE NAME		THE FILE YOU WANT		
5			AND HIT ENTER		
6					
7	BUDJAN		Jen budget		
8	BUDJANA		Jen actual costs		
9	PJAN		Projections done in Jan		
10	BUDFEB		Feb budget		
11	BUDFESA		Feb actual costs		
12	PFEB		Projections done in Feb		
13	BUDMAR		March budget		
14	BUDMARA		March actual costs		
15	PMAR		Projections done in March		
16	AUTO123		This index		
17					
	\B,\Z	{home}{goto}b?"			
		{?}/c"FILENAME"			
		/er			
	FILENAME				

Figure 4: A files menu and accompanying macro.

dex and macro in Figure 4 list the worksheets on your disk, give you a short description of them, and let you retrieve one by moving the cursor to its name and hitting Enter. The index works by copying the filename in the cell the cursor is on into the blank cell in the fourth row of the macro. Just be sure to name that blank cell FNAME. The macro itself is named \O, so it runs automatically. (It's also named \Z so you can call it from within the worksheet if you like.) If the index worksheet is stored as AUTO123.WKS, it will fire up as soon as you load 1-2-3.

In this example, the macro will be visible, but normally you would keep it out of sight. Obviously, you must update the index as you add files to the disk, but you can have as many files and as much description of them as will fit on the screen.

Steve Bridcut  
Oshawa, Ontario  
Canada

*This is a clean, simple menu system that works well with floppy disks. Since I prefer to type a number rather than move the cursor and hit Enter, I would suggest that you make one small change to your system. In the column to the left of the list of filenames I would recommend putting the numbers of the rows of the spreadsheet. Then I would change the second line of your macro to read*

```
/cb{?} "FILENAME"
```

*That way, as soon as the menu comes up, you could type the number next to the filename and hit Enter, rather than pound the Cursor down key. It's a lazy solution, of course, and it won't work if there is more than one column of filenames, but it's quick and easy.*

*This menu technique will also keep track of files on a hard disk if you make a separate index worksheet for each subdirectory.*

## ■ SPREADSHEET CLINIC

### BASIC AND 1-2-3

Sometimes you may want to process 1-2-3 data in ways that go beyond the scope of macros. While there are exotic, expensive programs that can process 1-2-3 files in DIF or ASCII formats, you can also use plain BASIC.

The trick is to edit your spreadsheet so that it looks like a set of BASIC data lines. All this takes is adding line numbers and commas to separate the data fields. You can quickly put in line numbers with the /Data Fill command, using step 10. To add the commas, insert columns that are one character wide, and /Copy the commas wherever they are needed. Save your spreadsheet with the /Print File command, and it will be in ASCII. You can now MERGE or CHAIN MERGE this file into a BASIC program.

You can even use 1-2-3 as a full-screen editor to write BASIC programs, with data included. Just save the end product as a

■ You can even use 1-2-3 as a full-screen editor to write BASIC programs, with data included.

print file. Then load it in BASIC with

LOAD "drive:filename.PRN"

If you need to reedit the program, use

SAVE "drive:filename.PRN" A

Using the A option with the SAVE command makes BASIC save the file in ASCII form so that 1-2-3 can read it.

A word of caution: If a BASIC program you write in 1-2-3 has long lines that wrap

to the next line, you must still number the lines with the wrapped fragments. If you don't, BASIC will stop loading 1-2-3 "code" when it runs into an unnumbered line. Once the code is loaded, however, you should list the part with excess line numbers. Delete the line numbers and spaces to get long lines of BASIC instead of numbered fragments.

Bob Pettinato  
Torrance, California

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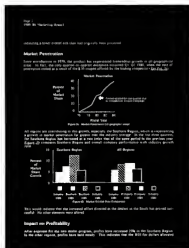
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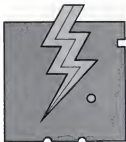
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■ EDITED BY CRAIG L. STARK



# POWER USER

*Push your hardware and applications software to the limit by incorporating these productivity-enhancing tips from our readers.*

## HIDDEN GRAPHICS SCREEN UPDATE

I've recently written a Turbo Pascal program that uses a record to define the medium-resolution color graphics display so I can write directly to the screen buffer. The medium-resolution mode is 320 by 200 pixels of four colors. Each byte stores 4 pixels with 2 bits to define the four colors. What makes things slightly more complicated is that the even and odd lines are stored separately.

The "setpixel" routine shown in Figure 1 takes a row, column, and color argument, reads the appropriate byte, and sets the bits to the specified color. The display is first read into a work buffer, then written back to the screen when everything is done. Using a work buffer allows these operations to be carried out unseen (perhaps while a user is reading a screen) and then immediately displayed.

Donald L. Pavia  
Bellingham, Washington

The "setpixel" procedure shown in Figure 1 didn't prove to have any real speed advantage over Turbo Pascal's "plot" procedure, even after I replaced the multiplications and divisions in Mr. Pavia's original submission with equivalent shift (shr and shl) instructions.

The real point of this program, however, is to demonstrate that you can easily move an entire screen into memory, work on it, and then move it back instantaneously. "Working on it" takes the bulk of the time, but Turbo's very fast array-to-array assignments provide a real pop to the up-

date. You can also use the technique with text screens.

I mentioned the speed advantage of shift instructions over multiplication and division. Whenever you have to multiply or divide integers by a power of 2 (2, 4, 8, 16,

and so on), a bell should go off in your head. Multiplying by 2 is the same as shifting left one bit. Integer division by 8 just shifts right 3 bits.

Inside the 8086 microprocessor, integer multiplications and divisions take

```

program setpixels;
type grefScreen = record
    evenpixel : array[0..99, 0..79] of byte;
    filler    : array[1..192] of byte;
    oddpixel  : array[0..99, 0..79] of byte;
end;
var i, j, k : integer;
    colorbuffer : grefScreen absolute $B800:$0000;
    workbuffer : grefScreen;
procedure setpixel (col,row,color : integer);
    var shift,mask, cmeek, workbyte : byte;
begin
    if odd (row) then
        workbyte := workbuffer.oddpixel [(row-1) shr 1, col shr 2];
    else
        workbyte := workbuffer.evenpixel (row shr 1, col shr 2);
    shift := (col shr 8) shr 2;
    meek := not ($C0 shr shift);
    cmeek := color shr (6 - shift);
    workbyte := cmeek or (workbyte and mask);
    if odd (row) then
        workbuffer.oddpixel[(row-1) shr 1,col shr 2] := workbyte;
    else
        workbuffer.evenpixel[row shr 1, col shr 2] := workbyte;
end;
begin;
    clrscr; graphcolormode;
    graphbackground (1); palette (0);
    workbuffer := colorbuffer;
    for i := 8 to 319 do
        for j := 1 to 3 do
            for k := 1 to 3 do
                setpixel (i, 50 * j + 10 * (k - 1), k);
            for i := 8 to 198 do
                for j := 1 to 5 do
                    for k := 1 to 3 do
                        setpixel (60 * (j - 1) + 20 * k, i, k);
                    write ('READY! Press <ENTER>: '); readln;
                    colorbuffer := workbuffer;
                    readln;
                    textmode (c80); clrscr;
                end;
            end;
        end;
    end;
end;

```

Figure 1: A Turbo Pascal routine and demonstration program showing a method for reading a graphics screen display, drawing colored lines, and then immediately refreshing the display.



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about eight times longer to execute than shift instructions. While the overhead in a compiled program lessens this time difference, it's still significant. To see for yourself, just run the short program shown in Figure 2. You'll find the shifts take half the time. (The calculation of elapsed time in this program uses the clock value that the PC's BIOS increments 18.2 times per second.)

Many professional compilers will automatically detect multiplication or division by a power of 2 and substitute a shift instruction. Turbo leaves it up to you to be aware of the speed difference and make the substitution yourself. —Charles Petzold

### PARAGRAPH SPACING IN WORDPERFECT

Instead of double spacing between paragraphs, I find that a spacing of 1 1/2 lines looks more like typeset output. *WordPerfect's* macro facility makes this easy to implement.

To make the macro for changing line spacing to 1 1/2, define the macro and name it (I use Alt-L). Then go to the menu for line spacing (Shift-F8 and choose 4) and enter 1.5 for the line spacing. A carriage return must then be entered, followed by the reverse action to get you back to single spacing. Then end the macro. If an indent is desired, place as many spaces as desired after the carriage return. Pressing Alt-L will invoke the macro.

Lawrence W. Lockwood  
Arlington, Virginia

The macro described works very well with just one correction. Two carriage returns must be used—the first one for entering the line-spacing change, and the second for the actual spacing between paragraphs. —Dawn Gordon

### THE XYWRITE EXCHANGE

I am a professional writer, and I use *XyWrite II Plus* as my word processor. Unfortunately, *XyWrite* does not include three commands I used frequently in my former word processor (*ScripSir*), namely the ability to exchange adjacent words, sentences, or paragraphs.

Fortunately, however, *XyWrite* does have all the necessary Function Calls to perform these commands already built in, and its keyboard customizing facility allows you to add them permanently in a matter of minutes.

For the IBM PC, *XyWrite* uses the F8 key to move defined text, and Alt-F8, Shift-F8, and Ctrl-F8 all duplicate the same MV function. To redefine these last three keys to exchange adjacent words, sentences, and paragraphs, respectively, just call up the IBM.KBD file, find "TABLE=ALT", and change the MV instruction for key 66 (the F8 key) to

DW, PW, PW, MV

That will implement the word exchange. Next, in "TABLE=SHIFT", change key 66 to

DS, PS, PS, MV

```
program shift ;
var i, j, time : integer ;
begin ;
  j := 1234 ;
  write ('30,000 Multiplications and Divisions by 16 ....') ;
  time := memv ($0040:$006C) ;
  for i := 1 to 30000 do begin
    j := j * 16 ;
    j := j div 16 ;
  end ;
  writeln ((memv ($0040:$006C) - time):5, ' clock ticks') ;
  write ('30,000 Shl's and Shl's by 4 ....') ;
  time := memv ($0040:$006C) ;
  for i := 1 to 30000 do begin
    j := j shl 4 ;
    j := j shr 4 ;
  end ;
  writeln ((memv ($0040:$006C) - time):5, ' clock ticks') ;
  writeln ('Get the point?') ;
end.
```

Figure 2: Integer multiplication and division by powers of 2 should be replaced by shr and shl instructions in Turbo Pascal programs. This short program demonstrates the speed advantage.



## ■ POWER USER

Its options include: (1) Outline, (2) Para No., (3) Redline, (4) Remove, (5) Index, (6) Define, (7) Generate: 0

The one that you want is (5) Index. If you want to index the word "interested," you put the cursor at the beginning of the word, then press Alt-F5. When the above menu appears, just press 5, which then gives you "Index Heading: interested." To index the word, just press Enter and end the macro. From there on, all you have to do is hit Ctrl-A for every word you want indexed.

After adding all the words you want to index, the next step is to define and generate the index itself. A macro called "Ctrl G" is used to bring up the WordPerfect index menu (as above) and to invoke the following commands:

```
Alt 5 6 8 2 Alt F5 7
<Enter>
```

In this way the index is defined and generated.

Richard L. Howcy  
Laramie, Wyoming

*While the use of any external macro utility with WordPerfect is possible, WordPerfect itself has a very powerful macro system of its own. The macros you describe above can be handled more efficiently with WP macros defined as Alt-alpha combinations. WordPerfect itself also offers what ONEKEY does not: the ability to create chained and conditional macros for various situations. Since ONEKEY can store only 30 macros, it makes more sense to use WordPerfect macros for more-complex operations (such as indexing) with Alt-alpha assignments and then use ONEKEY for Ctrl-alpha assignments. Because WordPerfect can invoke macros with only a single keystroke command when using*

*Alt-alpha definitions (Ctrl-alpha, function key, and named macros take more keystrokes to invoke), you can get more flexibility by using ONEKEY (or any other macro utility) in conjunction with Ctrl-alpha assignments. In any case, when setting up a macro of any kind, always use a copy of the document you are working on. This way you won't lose text accidentally.—Dawn Gordon*

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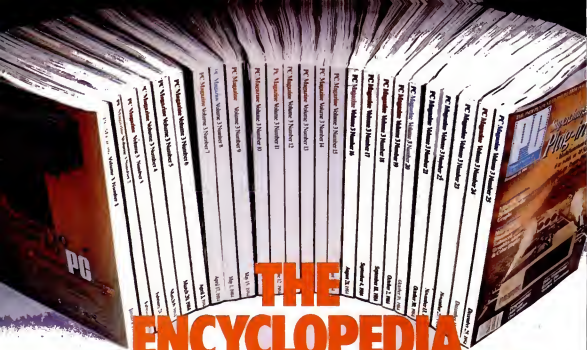
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■ EDITED BY PAUL SOMERSON

# USER-TO-USER



*PC Magazine's readers share their favorite tricks for getting the most horsepower out of DOS, BASIC, and their systems in general.*

## BEST FILE FINDER YET

A popular, widely circulated program called WHEREIS.COM, originally written several years ago by John Socha, let you search entire hard disks for files defined by a wildcard filespec. For instance, to find every file that began with the letters PC, you would type in

```
WHEREIS PC*.*
```

This program was very helpful not only for locating particular files but also for finding all the directories where such files resided.

In my own experience, different versions of the same files tend to clutter a number of directories. Once in a while I do some housecleaning, and WHEREIS.COM has always come in very handy. Unfortunately, it displays no information on the size or date of the files. So I found myself going into every directory listed by WHEREIS.COM to check on the size, date, and time of the file to figure out which was the most recent version.

I've written a program called FDA.COM, for FinDAll, that is based on WHEREIS.COM. FDA.COM displays the path, size, date, and time of every matching file it finds. With a minor code change, the program extends the search to the A: and/or B: drives. This is useful both for comparing files on diskettes with those on a hard disk and for backing up files. The program also searches subdirectories on diskettes automatically. It can also be used on systems without hard disks to list all files, by typing

```
FDA *.*.
```

The program FDA.BAS in Figure 1 generates the program FDA.COM. FDA.BAS prompts the user for the drives that

are to be included in the search. By renaming the file that FDA.BAS creates (in line 260), you can end up with several different

```
100 'FDA.BAS -- creates FDA.COM -- by E. J. Muth
110 DIM T(38):FOR A=1 TO 38:READ S1(A):S1=S1+G$S1NEXT
120 IF G=69210: THEN 140
130 PRINT "Error in lines 380-410":END
140 FOR A=1 TO 38:FOR B=1 TO 16
150 READ C$(C)=VAL("&H"+C$)
160 TOTAL=TOTAL+C$NEXT
170 IF TOTAL=T(A) THEN 190
180 PRINT "Error in line"IA*10+410:END
190 TOTAL=0:NEXT
200 RESTORE 420:CLS:KEY OFF:LOCATE B,1,1:INSERTX=0
210 ADDX=4:DRIVE$="A":GOSUB 320
220 ADDX=2:DRIVE$="B":GOSUB 320
230 ADDX=1:DRIVE$="C":GOSUB 320
240 IF INSERTX=0 THEN INSERTX=1
250 LOCATE 16,30,1:PRINT "Writing Byte No."
260 OPEN "FDA.COM" AS #1 LEN=1:FIELD #1,1 AS BYTE$
270 FOR I=1 TO 618
280 LOCATE 16,50,0:PRINT USING "####"I
290 READ HEXTW0$:IF I=609 THEN HEXTW0$=MID$(STR$(INSERTX),2)
300 LSET BYTE$=CHR$(VAL("&H" + HEXTW0$)):PUT #1
310 NEXT:CLOSE #1:LOCATE 18,20:PRINT "Done":PRINT:END
320 PRINT TAB(20)"Include drive "DRIVE$ " in search Y/N ? "I
330 A$=INKEY$:IF A$="" THEN 330
340 IF A$="Y" OR A$="y" THEN INSERTX=INSERTX+ADDX:GOTO 370
350 IF A$="N" OR A$="n" THEN GOTO 370
360 BEEP:GOTO 330
370 PRINT A$:PRINT:RETURN
380 DATA 1711,1790,2094,1211,1123,1235,1254,1382,1556,2028
390 DATA 1589,1661,2042,2654,2099,1633,1993,1938,1430,1954
400 DATA 1826,1736,1970,1533,2312,1760,2439,2081,1989,2097
410 DATA 2250,1514,2478,1479,1695,1604,2101,1961
420 DATA B2,0A,E8,E3,01,BE,82,00,FF,B9,03,AC,3C,0D,74,03
430 DATA AA,FB,FB,30,CA,AA,A0,60,03,24,01,74,14,BF,65,03
440 DATA 30,C0,FC,F9,40,00,F2,AE,8D,DF,4B,BA,00,00,E9,52
450 DATA 0E,A0,60,03,24,04,74,21,BF,65,03,C7,05,41,00,C7
```

(Figure 1 continues)

**Figure 1:** Program to create FDA.COM, which will search across subdirectories of both hard disks and floppies for any files and report the path, size, date, and time of any it finds. Once you've typed this in and created the file, use it in DOS with wildcard filespecs. For instance, to find every file that begins with the letters PC, type FDA PC\*.\*. For every .COM program, type FDA\*.\*.COM.

## ■ USER-TO-USER

versions of FDA.COM that can examine different disk configurations.

If you don't want to type in the BASIC program, you can enter the program using DEBUG. To do so, type the following, hitting the Enter key at the end of each line:

DEBUG FDA.COM

(Ignore the message "File not found.")  
Next type

E 100

Then type all the pairs of hexadecimal digits that start at line 420. Ignore the line numbers, the DATA words, and the commas, as well as everything before line 420. Hit the space bar between entries and then type in a

RET

when you are all finished. Then type RCX. DEBUG will display

CX 0000

To finish creating the program, type

26B

W

Q

hitting the Enter key after each.

FDA.BAS prompts the user for the drives to be included in the directory search. This information generates code that is inserted in place of the DATA statement in the first column of line 800 of FDA.BAS. The code is the sum of 1 for C, 2 for B, and 4 for A. For example, to search A and B, but not C, the value would be 6. You can also use DEBUG to change this value directly (it's located at 360h of FDA.COM).

Eginhard Muth  
Gainesville, Florida

*This program is really worth typing in. As Mr. Muth indicates, while other search programs reveal only the name and path of each file they locate, FDA prints the date, size, and time information you would have to extract manually to figure out which*

```

460 DATA 45,01,3A,00,C7,45,02,5C,00,C7,45,03,00,00,BB,DF
470 DATA 83,C3,03,BA,00,00,EB,2A,00,A0,60,03,24,02,74,21
480 DATA BF,65,03,C7,05,42,00,C7,45,01,3A,00,C7,45,02,5C
490 DATA 00,C7,45,03,00,00,00,DF,03,C3,03,BA,00,00,EB,02
500 DATA 00,CD,20,56,52,EB,65,01,EB,B2,01,72,0D,EB,5F,00
510 DATA EB,98,01,72,05,EB,57,00,EB,F6,5A,52,EB,57,01,EB
520 DATA 6B,01,72,24,8B,F2,F6,44,15,10,75,0B,EB,7C,01,72
530 DATA 17,F6,44,15,10,74,F5,00,7C,1E,2E,74,EF,EB,0B,00
540 DATA 50,B4,1A,CD,21,5B,EB,E4,5A,5E,C3,57,56,50,53,FC
550 DATA 8B,F2,83,C6,1E,8B,FB,AC,AA,0B,C0,75,FA,8B,DF,FD
560 DATA AA,B0,5C,AA,EB,9C,FF,5B,C6,07,00,5B,5E,5F,C3,50
570 DATA 52,56,53,51,83,C2,1A,BB,F2,8B,04,BB,54,02,BF,0A
580 DATA 00,EA,B6,00,B2,20,EB,DF,00,EB,DC,00,83,EE,02,BB
590 DATA 04,25,E0,01,B1,05,D2,FB,EB,90,00,B2,20,EB,CB,00
600 DATA BB,04,25,1F,00,EB,A5,00,B2,20,EB,BB,00,BB,04,25
610 DATA 00,FE,B1,09,D3,EB,05,50,00,EB,91,00,B2,20,EB,A7
620 DATA 00,EB,A4,00,B3,EE,02,BB,04,25,00,FB,B1,0B,D3,EB
630 DATA EB,50,00,B2,3A,EB,90,00,BB,04,25,E0,07,B1,05,D3
640 DATA FB,EA,69,00,B2,20,EB,7F,00,EB,7C,00,59,5B,5E,BA
650 DATA 63,03,BA,07,C6,07,00,EB,CF,00,BB,07,5A,52,83,C2
660 DATA 1F,EB,C5,00,EB,B3,00,5A,5B,C3,31,C9,F7,F7,B3,C2
670 DATA 30,52,31,D2,41,09,C0,75,F3,BA,20,00,52,41,B3,F9
680 DATA 07,75,F9,B4,02,5A,CD,21,E2,FB,C3,31,D2,F7,F7,83
690 DATA C2,30,52,31,D2,F7,F7,09,D2,74,03,B3,C2,10,83,C2
700 DATA 20,52,B9,02,00,B4,02,5A,CD,21,E2,FB,C3,31,D2,F7
710 DATA F7,83,C2,30,52,31,D2,F7,F7,B3,C2,30,52,B9,02,00
720 DATA B4,02,5A,CD,21,E2,FB,C3,31,D2,CD,21,C3,56,BE,B9
730 DATA 03,EA,0B,00,5E,C3,5E,BE,61,03,EB,02,00,5E,C3,50
740 DATA 57,BB,FB,FC,AC,AA,0B,C0,75,FA,5F,5B,51,83,FA
750 DATA 00,77,03,BA,9B,03,B3,C2,2B,B9,10,00,B4,1A,CD,21
760 DATA 52,BA,65,03,BA,4E,CD,21,5A,59,C3,51,52,BA,65,03
770 DATA B9,10,00,B4,4F,CD,21,5A,59,C3,50,52,BA,02,B0
780 DATA CD,21,B2,0D,CD,21,5A,5B,C3,50,52,5E,FC,BB,F2,B4
790 DATA 02,AC,AA,0D,CD,21,AC,0B,C0,75,F7,5E,5A,5B,C3,00
800 DATA 05,2A,2E,2A,00,43,3A,5C,00,00

```

(Figure 1 ends)



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## ■ USER-TO-USER

version of similarly named files are which. Alternatively, you could use Charlie Petzold's elegant SWEEP.COM program to do a directory search across every subdirectory on your hard disk (see Programming/Utilities column in PC Magazine, Volume 4 Number 23), but even that technique won't search both hard disks and floppies the way FDA does.

We added line checksums in the BASIC version to make the inevitable typo-hunting far easier. Entering hex codes in DEBUG, as Mr. Muth suggests, is fine for short programs, but for something like this, BASIC is far more forgiving and easier to work with. If you do take his advice and change the drive code in the DATA statement in line 800, remember to change both the 1961 checksum at the end of line 410 and the master 69210! checksum in line 120 to reflect the alteration. (Or you can download the program from PC Magazine's Interactive Reader Service.)

### SNEAKY BOOT TRICKS

I read with interest Tan Lay Sar's technique for patching COMMAND.COM to execute a file other than AUTOEXEC.BAT on boot-up (User-to-User, PC Magazine, Volume 4 Number 24).

I give this trick a twist by dropping the BAT extension. This way, COMMAND.COM will execute the boot batch file only on boot-up. Attempts to run the file a second time result in the "Bad command or filename" message. This is ideal for using some of those neat little programs that stay resident but crash the system if you run them twice.

Next put the run-once-only programs in a hidden directory. You can access a directory using CD or CHDIR although it is hidden from normal display using DIR or TREE.

For DOS 2.0 or 2.1 patch your factory copy of COMMAND.COM by getting into DOS and typing

```
DEBUG COMMAND.COM
E 107B "ONCE"
W
Q
```

The added blanks are to erase the string "AUTOEXEC.BAT" completely.

Then create a file named ONCE (but without the .BAT extension) containing your initialization programs or whatever in the usual batch file format. You might even make the last entry a branch to an AUTOEXEC.BAT file to mislead the uninformed. At this point it is unlikely a casual user will spot your secrets.

In the same line of thought, IBMBIO.COM may be unhidden (use the Norton Utilities FH.COM Program) and the string CONFIG.SYS replaced with any string of an equal or shorter length. I can't imagine why you would want to do this other than to annoy a software thief.

While patches of this sort are usually done with DEBUG, the Norton Utilities

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## ■ USER-TO-USER

Sector Modify (SM.COM) program, or equivalent program, I would like to point out that PC-Write by Quicksort is quite capable of editing machine code files. PC-Write searches through the machine code rubbish to find specified ASCII strings with astonishing speed. If care is taken to use the overwrite mode, the altered program will run normally (except, of course, for your change). I have also successfully used PC-Write to customize program logos and rewrite menu screens and help and message overlays.

Patching may also be possible with other editors that use the declared file length rather than an end-of-file mark and allow the use of the full 256-character IBM character set. Experiment (on copies, of course) and see what happens.

Roger B. Russell  
Thousand Oaks, California

*Nifty idea. It's true that COMMAND*

*.COM will run both an AUTOEXEC program that lacks a .BAT extension, as well as normal .BAT, .COM, or .EXE programs in hidden subdirectories. The best way to execute Mr. Russell's trick is to change the AUTOEXEC.BAT reference in COMMAND.COM so it reflects the hidden path.*

*The following technique is for floppies only—playing with your hard disk directory in DEBUG can be very dangerous. In fact, be sure to type everything exactly as shown—if you read a directory off a floppy disk and write it back to a hard disk, well, that's what backups are for. And these instructions are also expressly for DOS 3.1, although the same fundamental technique will work for other versions.*

*First, put a blank floppy disk into drive B: and format it with the /S option. Next, create a subdirectory on this floppy called simply \A (by typing MD \A). Then, with this floppy still in drive B:, get into 3.1 DE-*

*BUG (if you don't have a hard disk with DEBUG already PATCHed to, put a disk with DEBUG on it into drive A: and type A:DEBUG), and at the DEBUG hyphen prompt, type*

*-L 100 1 5 5*

*to load the beginning of the directory on drive B:. This is very important—DEBUG refers to drive A: as 0, drive B: as 1, drive C: as 2, etc. Be very careful in using DEBUG to write to a disk! Avoid writing to drive 2, which is drive C:!*

*To hide the \A subdirectory (or any unhidden file), all you have to do is add 2 to the value of the 12th byte (which is actually byte 11, since the first byte is byte 0). Since subdirectory names are really just files, the \A subdirectory will be the fourth file on your disk (after IBMIO.COM, IBMDOS.COM, and COMMAND.COM). Type D to see all four directory entries.*

*The listing for \A will begin at address*

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 \end{aligned}$$

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## ■ USER-TO-USER

160. Byte 11 (which is really the 12th byte, remember) has a value of &H10. Adding 2 to it yields a value of &H12. So to hide the subdirectory, at the hyphen prompt, type

-E 16B 12

Then write the new directory back to disk by typing, very carefully

-W 100 1 5 5

(This is exactly what you typed to load the directory, except that the L is replaced by a W.) You'll find the \A subdirectory is invisible to such DOS commands as DIR and TREE (but not to CHKDSK /V or CD). When finished, type Q to quit DEBUG.

Once you've hidden the subdirectory, you have to change COMMAND.COM so it knows where to look for your boot file. Since AUTOEXEC.BAT takes up 12 characters, there's plenty of room for both a path and a secret filename for your boot program. Let's call the AUTOEXEC.BAT substitute program \A\SECRET. In DOS 3.1, \AUTOEXEC.BAT begins at address 130E, but since our hidden subdirectory is called \A, we'll leave the first two characters "\A" alone. The remaining UTOEXEC.BAT begins at address 1310, so we'll change that to \SECRET by typing

-E 1310 "\SECRET"

followed by the usual W to write the file to disk and Q to quit. Note there are four spaces at the end to pad out the unused characters, since \SECRET is shorter than UTOEXEC.BAT. Then copy your normal AUTOEXEC.BAT routine to B:\ASECRET, and you're all set. Obviously, if you want to do this right, you'll use a name other than SECRET, which would provoke unnecessary curiosity. Note: If you make a mistake while in DEBUG, immediately enter Q to quit before writing anything, then start over.

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# THE ELEGANCE AND POWER OF C

Here are four books on learning today's most important programming language. "Efficient C" helps you write C programs that look as if they were written in assembly language.



The C programming language is often cited for its portability among different computers, operating systems, and compilers. This presents a dilemma for authors of books about C because, in theory, the language should be discussed without reference to a particular computer or compiler. Yet, much of the crucial information necessary for beginners will certainly be unique for every compiler.

**GRADUATING FROM BASIC** The program examples in Herbert Schildt's *C Made Easy* were all tested by the author with the IBM PC version of the popular Aztec compiler. However, Schildt does not really discuss using the Aztec compiler or any other specific package. Instead, the book concerns a mythical, plain-vanilla C with a very tiny library. This approach doesn't work entirely. For someone learning C, it's much too limiting to not be introduced to the vast collection of standard C library functions that are included with all but the most limited compilers.

*C Made Easy* will be most useful to people already familiar with BASIC because examples of C programs are shown alongside the BASIC equivalents. The book covers a lot of ground, even touching on some of the more arcane features of C, such as pointers to functions and linked structure lists. The long chapter on file I/O is very good. The only serious omission is the treatment of string manipulation, which is scattered about and not nearly adequate.

The book could have benefited from

more attention to the order in which material is presented. The number of somewhat advanced topics included in the early chapters (such as variable scope and function definitions) will be overwhelming to those BASIC programmers Schildt is trying to convert.

■ **For the BASIC programmer who doesn't fear some confusion along the way, *C Made Easy* has most of what you'll need to get started.**

The self-imposed, plain-vanilla C orientation also forces the author to frequently advise readers to check their compiler manuals for implementation-dependent features. But for the BASIC programmer who doesn't fear some confusion along the way, *C Made Easy* has most of what you'll need to get started.

**NOT JUST FOR THE IBM PC** *Personal Computing and C*, by John A. Gainsborough, takes a different approach to the "standard C" versus "real C" dilemma. Gainsborough deals with a real Aztec C compiler, but he spends equal time discussing how to use the compiler,

linker, and even the library manager on an IBM PC, a CP/M system, and the Apple II. The chapter on header files and other preprocessing techniques shows how to account for machine differences. There is an important example here concerning screen display control. A short appendix covers the IBM PC Lattice C compiler.

In general, however, *Personal Computing and C* is unsatisfactory. It covers a lot of material but is weak on explanation. The discussion of pointers (a crucial part of any C introductory book because the subject is difficult for beginners but essential for fully tapping C's powers) is simply inadequate.

The author treats each topic in a consistent format with a brief explanation and a program example. The program example makes a point rather than merely complementing the discussion. Most of the time, however, Gainsborough doesn't disclose what will happen when you run the program. This forces you to try out the program to understand what's going on.

**SHARPENING YOUR SKILLS** Thomas Plum is attempting to remedy the lack of books for the advanced programmer. His earlier *Learning to Program in C* covered the basics. *Reliable Data Structures in C* goes far beyond that.

*Reliable Data Structures in C* is ostensibly an in-depth treatment of some of the toughest and most important aspects of C: arrays, pointers, structures, and file input/output. Toward the end, Plum delves into dynamic data allocation, binary trees, and double-ended queues. This is heavy stuff.

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## ■ BOOK REVIEW

In the midst of these discussions, Plum develops a set of rules for creating C programs that can be reliable and portable. He frequently points out examples of the type of code that may run fine on one machine but may actually contain hidden, elusive bugs that will become apparent only when the program is ported to another machine.

**CRANK 'EM UP** C was designed with the real world and real computers in mind, but it's up to the programmer to take ad-

vantage of its power. *Efficient C*, coauthored by Thomas Plum and Jim Brodie, is a fascinating exploration into program efficiency. The authors tested their programs on a VAX-11/780, a PDP-11/23, a Motorola 68000, and the 8088-based IBM PC. (The Lattice 2.15 C Compiler was used on the IBM PC.)

As the result of extensive testing, Plum and Brodie have put together charts showing comparative execution times and code sizes for standard C operations on the four



## FACT FILE

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CIRCLE 875 ON READER SERVICE CARD

### Efficient C

Thomas Plum and Jim Brodie  
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Cardiff, NJ 08232  
(609) 927-3770  
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CIRCLE 873 ON READER SERVICE CARD

■ **Efficient C** is a book to periodically reread just to remind yourself of the special elegance and power of today's most important programming language.

different machines. Using these results and other tests, *Efficient C* presents numerous techniques for speeding up programs and cutting down on their size. (Sometimes these two goals are in conflict.)

One of the more interesting exercises illustrated in *Efficient C* involves converting a Pascal program into C. The authors show how to take advantage of features unique to C and improve execution speed over the straight translation by over 25 percent.

Probably the greatest compliment a C programmer can receive is to be told that a program runs as if it were written in assembly language. *Efficient C* can help achieve that goal. This is a book to periodically reread just to remind yourself of the special elegance and power of today's most important programming language. (See "The C Around Us," *PC Magazine*, Volume 5 Number 3, for reviews of two other C programming books.) ■

Charles Petzold is a contributing editor of *PC Magazine*.

■ EDITED BY CHARLES PETZOLD

# PC TUTOR



*PC Tutor answers your questions on everything from programming and operating systems to hardware and applications software.*

## GRAPHICS CHARACTERS FROM WORDSTAR

I've been using WordStar 3.3, and I still cannot figure out how to print the ASCII characters above 128. Is it even possible? I can't even get them to print on my Toshiba P1351, though they work with an LPRINT CHR\$(#) statement. I would really like to be able to use those symbols and the Greek letters in WordStar if at all possible.

Cynthia Anders  
Simi Valley, California

*This is a question that has a very personal interest, because patching WordStar for access to printer graphics symbols was the very first real-life 8086 assembly language programming I did on the IBM PC. When it worked the first time (beginner's luck), I knew that I had found my destiny.*

Since that time, many word processing packages for the IBM PC have been introduced that will handle these characters on the screen and on the printer with no real problem. Perhaps we WordStar users are using an archaic product, but I'd rather fight than switch.

WordStar uses ASCII codes above 128 for its own internal purposes, such as denoting soft carriage returns and soft spaces. WordStar will not display these extended ASCII characters on the screen. Nor will it send these extended characters to the printer. So, we must patch WordStar to force it to do so. You still won't see the characters on the screen in WordStar, but they can be printed on the printer.

As you may know, Ctrl-PQ, Ctrl-PW, Ctrl-PE, and Ctrl-PR are user-definable

printer control combinations. We'll be using two of them for printing these graphics characters. I selected Ctrl-PQ and Ctrl-PW to control graphics-character printing because Q and W are the first two letters of

"graphics" if you pronounce it like Elmer Fudd. [Now you know why some of us have never been able to think like WordStar people—Ed.]

Figure 1 shows a batch file you can cre-

```
GOTO LOADWS
E 02E0 0 0
A 02E2
CMP AL,1E ; CTRL-PQ MARKER
JNZ 02F1
XOR BY [02E0],00
MOV BY [02E1],00
RET
CMP AL,1F ; CTRL-PW MARKER
JNZ 030D
XOR BY [02E1],40 ; *** TOSHIBA: MOV BY [02E1],00
XOR BY [02E0],00
MOV AL,1B
CALL 07E5 ; PRINT
MOV AL,37 ; *** TOSHIBA: MOV AL,3F
JZ 030A ; *** TOSHIBA: MOV AL,3D
MOV AL,36
JMP 07E5
OR AL,[02E0] ; FLAG CHARACTERS
XOR AL,[02E1]
JMP 07E5 ; PRINT

A 07DD
JMP 02E2

E 077F 01 1E
E 0784 01 1F
N WSG.COM
W
Q
;LOADWS
DEBUG WS.COM <WSGRAPH.BAT
```

Figure 1: A batch file, WSGRAPH.BAT, to modify WordStar for access to printer graphics characters.

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## ■ PC TUTOR

ate in WordStar nondocument mode to make the patch. Call it WSGRAPH.BAT. Be sure to include the two blank lines near the bottom. You'll need to be running DOS 2.0 or above. The batch file, WSG.COM, and DEBUG.COM must all be on the default drive (and subdirectory) when the batch file is executed. Don't worry about the error message you get from DEBUG when it encounters the GOTO LOADWS line. The batch file creates a file WSG.COM, which will be the patched version of WordStar. After you use WSG and decide that the patch works and has not damaged anything else, you can get rid of WSG.COM on your working diskette (but not your original) and rename WSG.COM to WSG.COM.

The batch file is set up to patch WordStar for access to the graphics characters in the IBM Personal Computer Graphics Printer, because the extended character set on this printer has become an industry standard for PC printers. The Toshiba 1351 has a very different graphics character set, so you should substitute the lines shown at the right in Figure 1, labeled for the Toshiba.

For the IBM Graphics Printer, to print a graphics character with an ASCII code between 156 and 254, subtract 128 from the ASCII code, type that character, and put a Ctrl-PQ before and after the character. (For example, the Greek pi symbol has an ASCII code of 227. Subtract 128 to get 99. This is the ASCII code for lower-case c. Type Ctrl-PQ, followed by c, and another Ctrl-PQ. On the screen it will look like "Qc"Q, but it will print as a pi.) For graphics characters with ASCII codes between 128 and 155, type a Ctrl-PW before and after each character subtracting 64 from each ASCII code.

The Toshiba has two sets of graphics characters. For graphics characters with ASCII codes between 160 and 191, subtract 128 and use Ctrl-PQ before and after. For the coded graphics characters with ASCII codes between 224 and 254, also subtract 128, but use Ctrl-PW before and after.

You can use Ctrl-PQ or Ctrl-PW around strings of characters to make line and box drawings. However, the pairs of Ctrl-PQs or Ctrl-PWs must be on the same line. Watch out for embedded spaces, be-

cause these will also be translated. Do not use any other print control inside the pairs of Ctrl-PQs and Ctrl-PWs. Do not use this patch at all if you've installed WordStar to use microjustification.

With either of these patches, the first thing you'll want to do is set up a table in WordStar with all the regular characters you can type from the keyboard, the same characters surrounded by Ctrl-PQs, and also surrounded by Ctrl-PWs. Print it out and keep it near your machine so you don't have to keep making crazy calculations in your head.

If you want to make boxes on the printed page, all those "Qs and "Ws are going to look pretty ugly on the screen, and they'll prevent you from lining things up right. You can turn off the display of printer control codes by toggling Ctrl-OD.

One problem with the Toshiba is that the line-character graphics do not connect on the vertical or horizontal. The easiest way to solve this problem is to keep around some primitive tools called a ruler and a fine-point felt tip pen and connect the lines (forgive the expression) manually.

## FOR A GREENER ENVIRONMENT

I have an IBM PC-XT with PC-DOS 2.1 and an IBM PC AT with PC-DOS 3.1, each with 640K bytes of RAM, and I have not found a way to work around the "Out of Environment Space" error message I encounter when using the SET command to set up the environment. The DOS manual mentions a limit of 127 bytes if a resident program has been loaded, but even without using any resident programs, I still have the problem. Is there any way to enlarge the memory environment?

John N. Ackley  
 Huntington, New York

If you have not loaded any resident programs, the DOS manual is correct: you can sit at your keyboard all day and enter multitudes of SET commands, gradually filling up your environment to its 32K-byte maximum limit.

Of course, normal people don't do that. Normal people put a PATH command, a PROMPT command, and a bunch of SET commands in an AUTOEXEC.BAT file. The whole purpose of batch files is to avoid having to type a lot of commands manual-

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ly. But, strange to tell, as soon as you run an AUTOEXEC.BAT file, the environment becomes limited to 160 bytes.

When COMMAND.COM runs a batch file, it allocates a small area of memory to store the batch file name and other information. This is needed to return to execution of the batch file after running commands and programs within the batch file. For AUTOEXEC.BAT, this area of memory is placed 160 bytes after the beginning

■ An undocumented feature of DOS 2.0 and above allows environment strings to be used as replaceable parameters in batch files—most usefully in conjunction with the IF statement.

of the environment that COMMAND.COM maintains. Thus, it acts like a brick wall, effectively preventing the expansion of the environment beyond 160 bytes.

Fortunately, I can solve at least half of your problem, for PC-DOS 3.1 does have a way to enlarge the environment. What you must do is use a CONFIG.SYS file to specify COMMAND.COM as a SHELL. This is done with a line in the CONFIG.SYS file that reads

```
SHELL=COMMAND.COM /P /E:62
```

Without the /P parameter, COMMAND.COM would not execute the AUTOEXEC.BAT file. (This is something that goes back to DOS 2.0.) The /E parameter is new with Version 3.1. The value following the colon is the number of 16-byte paragraphs reserved for the environment. The default is 10 paragraphs (160 bytes) and the maximum is 62 (992 bytes). (If you set the value below 10 or above 62, COMMAND.COM will use the default of 10.)

Where can you find this documented?

Well, if you load the Version 3.1 COMMAND.COM under DEBUG and unassemble the code beginning at offset address 0E16, why it's obvious!

The only way you can solve the other half of your problem (without doing extensive surgical work on COMMAND 2.1) is to upgrade your XT to PC-DOS 3.1. Happily, that's a simple procedure—boot up the machine with the 3.1 DOS diskette in drive A:, run the SYS B: command, copy over COMMAND.COM, and copy all the other DOS files.

The DOS environment has yet to be fully exploited. Some compilers and assemblers search the environment for directories where library and include files may be found, but the environment can also serve as an all-purpose configuration file for application programs, as well.

An undocumented feature of DOS 2.0 and above allows environment strings to be used as replaceable parameters in batch files—most usefully in conjunction with the IF statement. For example, if you have a batch file that must do one of two different things depending upon whether ANSI.SYS has been loaded or not, you could use SET to create an environment string with this information:

```
SET ANSI=ON
```

or

```
SET ANSI=OFF
```

You could then check for this in a batch file, with the statement

```
IF %ANSI%==ON GOTO label
```

If COMMAND.COM finds ANSI in the environment, it replaces it with the set string when the batch file is processed. If ANSI had been set ON, the GOTO is executed; if set to OFF, the next statement is processed.

This undocumented feature works with PC-DOS versions 2.0, 2.1, and 3.1, but a bug in 3.0 makes COMMAND.COM stop reading the batch file line after it replaces the parameter.

The PC Tutor solves practical problems and explains points of general interest. To see your question answered here, drop a line to PC Tutor, PC Magazine, One Park Avenue, New York, NY 10016. ■

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# REVIEWS IN BRIEF

## Glimpsing into Your Documents with In-sight

BY VINCENT PUGLIA

Tired of scrolling through text files with cryptic names to learn what they hold? Take a look at Pearlsoft Inc.'s *In-sight*—the only program you may need to put your chaotically organized documents into some semblance of order.

can be as simple as searching for a single match or as convoluted as searching via such conditional operators as "and," "or," and "not." Searches—which can traverse volumes and directories—are also allowed on the basis of filename and file date. Whichever method is used, the result is the same—all of the

the situation found in your documents.

The use of libraries also enables you to reaccess your text files without having to resubmit the same queries. If disk space is important, you can archive the least-used libraries to floppy.

While working with the program, I ran across one oddity. *In-sight* uses a .DTX extension for its library files. *SmartKey* uses the same extension for its macro files. As a result, when *In-sight* attempts to read a macro file with the same extension, it mistakenly reports that the file is corrupted.

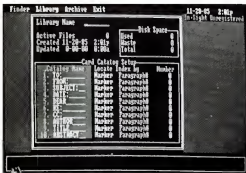
While some of *In-sight*'s

features may be found in other programs, Pearlsoft has gathered and enhanced them in one elegant package. Borland International's *Turbo Lightning* may provide access to prepackaged, custom-made databases, but if you regularly access your own text files by content, *In-sight* is a must to have.

### *In-sight* 1.0

Pearlsoft Inc.  
P.O. Box 638  
Wilsonville, OR 97070  
(503) 682-3636  
List Price: \$95  
Requires: 256K RAM, two disk drives, DOS 2.0 or later.

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The file creation function screen from *In-sight*.

This text-based information retrieval system retrieves documents by word, phrase, or matching letter combination. Controlled via pull-down menus and pop-up screens, *In-sight* makes good use of function and cursor keys and features a DOS toggle, context-sensitive help, and direct access to your word processor.

*In-sight* requires you to identify your drives and text files before executing queries. Wildcards are permitted in establishing the program's initial defaults, so you can, for example, specify "\*.DOC" as valid document files for searches. You must also establish which of seven word processors was used to produce the documents.

Retrieving documents involves entering a query, which

files matching the search criteria are at your disposal for further manipulation, printing, or viewing. If you decide to view the file's contents, the search criteria are highlighted.

You can also place your documents in library files using indexes based upon either your paragraphs or *In-sight*'s own text-marking scheme. While the markers provide faster results, they require that the documents contain the same word in the same area of the text. Because of this requirement, memos, sales reports, and abstracts are ideally suited to this type of search. Some of the markers available are "TO:", "RE:", "AUTHOR", and "CC:". You can use the markers as they are, delete them, or overwrite them so that they conform with

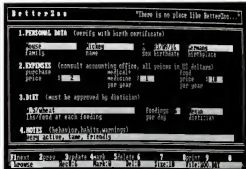
## File It with a Clear-cut Winner: ClearCut

BY VINCENT PUGLIA

Menlosoft's *ClearCut* may bring some real competition in the low-end data management market. A form-based data retrieval system, *ClearCut* offers many of the features found in such competing products as *PFS:FILE* and *PFS:REPORT*, but with an easier menu-driven interface. On top of that, its

manual and tutorial are clearly written and unimposing.

Although *ClearCut* permits only one open file at any time, that file can contain up to 65,000 records, with up to 512 fields each. To define a file, you type in field names and any extraneous text, drawing any desired borders with the IBM PC extended character set, and mark the input area by hitting



A data entry screen created using *ClearCut*.

the F1 key. A file's data entry/retrieval form can extend to six screens and 132 lines. You restructure a file by defining a new form and transferring the data from the appropriate fields.

Both alphanumeric and numeric searches are permitted on any combination of all fields. In addition to wildcard searches, you can search fields with such conditional operators as "and," "or," and "not." Global updating, deleting, and reformatting are also permitted. Fields can be sorted in ascending or descending order in as many as 512 keys. Finally, you can automatically insert the current date and time.

Reports, which can be directed to the screen or printer, can include headers and footers, page breaks, and page numbers. Fields can be totaled, subtotaled, and averaged. You can also calculate any field's maximum and minimum values during report generation. *ClearCut* also supplies a utility program that allows you to import and export data in ASCII format as well as configure your printer. Users who do not have an IBM-compatible printer will especially appreciate the latter. One of the utility's commands automatically converts the IBM PC extended character sets to ASCII substitutes, and, if you wish, you can change the default conversion by substituting your own characters. The utility also allows you to set your printer's modes and download character sets.

When importing and exporting data, *ClearCut* separates

fields with a tab character and records with a carriage return/line feed sequence. It will also accept a record separated with simply a carriage return. Because the program works with ASCII files, you can replace the separators with the character your own software uses.

*ClearCut* is not for everyone. For one thing, while its form-based design frees you from file-structuring considerations, it also prevents you from defining field types. As a result, there is no error trapping and no provision for moving fields or text once painted into a form. While *ClearCut* has an optional grid feature that you can use during form design, there are no column and row numbers, so you must manually count spaces in a form. Finally, you can browse only with the form, which allows you to view only one record at a time. If your form extends beyond two screens, you'll find yourself hitting function keys.

However, despite these drawbacks, *ClearCut* is an excellent, easy-to-use file management system for simple applications. It's a viable alternative if you're currently using or considering *PFS:FILE* and *PFS:REPORT*. ■

**ClearCut 1.0**  
Menlosoft  
5 Cheryl Pl.  
Menlo Park, CA 94025  
(415) 326-7285  
**List Price:** \$49  
**Requires:** 128K RAM, one  
disk drive. DOS 2.0 or later

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## PC Dossier: A Templated Personnel Database

BY VINCENT PUGLIA

**PC Dossier** attempts to fill a vertical market niche with a user-friendly relational database management system designed specifically to maintain information on people. While this menu-driven program lives up to many of its promises, its implementation is such that I question its overall usefulness.

Because *PC Dossier* uses a dedicated template, there is no need to structure a database. Each of the database's files comes with predefined fields. For example, the "People" file includes such fields as user-defined ID code and the individual's first and last name and middle initial. The ID code, which can be up to nine characters in length and divided into as

```

FUNCTION:
IF: 000 001 0 PEOPLE (SELECTION) 12/20/1985

      000 001 0 Branch Steven C
      000 002 0 Farkas/Pyro David H
      000 003 0 Farkas Michael B
      000 004 0 Haskie James
      000 005 0 Haskie Kim Ann
      000 006 0 Haskie Travis
      000 007 0 Haskie Janet T
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```

PC Dossier's People file data entry screen.

many as four sections, is used to access the "Personal Info" file. The latter file's fields include address, phone, group code, occupation, and notes. Certain fields, such as method of contact and marital status, are *PC Dossier*-coded, with a listing of these codes accessible on-line.

These predefined fields will satisfy the needs of many users. If they do not, you can define up to eight additional fields of the following customized types: integer, amount (integer with decimal), code, date, phone number, and text (up to 12 characters in length). You can also define up to ten 1-character codes per field.

Entering data, however, is not as simple as it should be. Where many database management systems permit nonsequential data entry, automatically sorting the record within the file on an index key, *PC Dossier* requires that you manually insert each new record at its indexed position in the file. As a result, you must know each new record's ID code and locate its position in the file. If the value of the ID code does not fall between the two surrounding records, the program refuses to complete the entry.

In addition, *PC Dossier* requires that certain of its program files reside on the data diskette; strangely enough, neither the program nor its documentation states this explicitly. An update to the appendix does list all of the program files, but how illuminating is *PT250.EXE*? Any attempt to run the program without these files results in an error message.

Another example of good intentions gone bad can be seen in the software's report implementation. Where an earlier version simply routed all reports automatically to the printer (and greeted you with DOS's usual "Abort, Retry, Ignore?" message if the printer was off-line), the current version allows you to send them to disk. However, *PC Dossier* does not allow you to display the reports. You must exit the program and use your word processor to view a report on-screen.

In its attempt to protect you from making too many decisions, the program and documentation even mislead you. The menu implies a restructure option that doesn't exist. The only restructuring occurs as part of the backup and restore operation, and it is really a compression of data.

*PC Dossier* may be an excellent program for some users needing or wanting to keep tabs on people, but it will fall short for many others. If you are currently maintaining a personnel database using a one-file database manager, *PC Dossier* is a step up. But because of its limitations and design bugs, it is still in need of more than one revision. ■

**PC Dossier 1.1**  
Champaign Systems Inc.  
324 W. Washington Blvd.,  
#1G  
Oak Park, IL 60302  
(312) 386-0062  
List Price: \$245  
**Requires:** 128K RAM, two  
disk drives. DOS 2.0 or later

CIRCLE 138 ON READER SERVICE CARD

## ■ THE SHORT REPORT BY PHIL WISWELL

# New Templates for Power Users of Power-Base

*Power-Base* is a relational database management system for those who cringe at the thought of mastering a program such as *dBASE II* or *III*. It is menu-driven rather than command-driven, with an intelligible system of prompts that keeps you out of its rather lengthy manual most of the time.

Still, you can't get the most out of *Power-Base* unless you've got a lot of time to spend on applications design. And wouldn't you rather be adding and analyzing data than redefining fields or establishing relationships between files? If so, *Power-Base* Systems has just published a series of business templates that you'll want to know about.

## Inventory Control

You really get your money's worth with this template. Its 21 files track and automatically compare invoices, receiving and purchase orders, component part and finished-product inventories, suppliers, customers, shipping, warehousing, in-house assembly, sales, damaged goods, and returns. *Inventory Control* is a rich and generous system that is also relatively easy to use, but you really need a hard disk. There are just too many files for you to manage this application effectively on floppies. Depending on your setup (you can redesign any aspect of these templates), the program has a limit of between 20,000 and 40,000 records per file.

*Inventory Control* comes with 20 predefined, ready-to-run reports for generating hard copy on component and product inventory status; bills of materials and lading; parts, product, and customer lists; cash flow; sales rankings; and so forth. Five predefined label formats for warehouse bins, shipping, and vendor and customer addresses are included, and as a nifty bonus, you also get six predefined outload formats. This feature allows you to ex-

port files such as current inventory status from *Power-Base* to 1-2-3, MultiMate, WordStar, Multiplan, VisiCalc, dBASE II, PFS:FILE, and more. For the power user with inventory problems, I highly recommend *Inventory Control* (*Power-Base* Systems Inc., 12 W. 37th Street, New York, NY 10018; (212) 947-3590; \$79.95; requires *Power-Base*).

## Order Processing

This template has a lot in common with *Inventory Control*: It tracks customer orders and invoices, returned goods and credits, products, suppliers, sales reps, and so forth, and includes the same comprehensive set of predefined reports. The basic difference between the two is that you can't track inventory with *Order Processing*.

The program uses 17 files to set up relationships among customers, products, components, sales reps, invoices, returned goods, credits, and vendors. Initializing the system is a matter of entering information for each of the files. For example, to establish a new product in your line, you enter a description in the product file, its parts in the components file, and its vendor in the vendor file. From then on, any transaction involving that product will automatically update all necessary files.

The program comes set up to print forms such as picking/packing slips, shipping labels, invoices, and credit memos, and there is a mail-merge facility to *MultiMate* and *WordStar*. *Order Processing* (\$79.95; requires *Power-Base*) needs a hard disk to run efficiently.

## Fixed Asset Management

*Fixed Asset Management* uses just six interrelated files to maintain and analyze information on your individual fixed assets. The first file is an asset record, including cost date

JOB NUMBER		Current Files: J000001		
ACCOUNT CODE	ACCOUNT NAME	OVERHEAD RATE	OVERHEAD COST	TOTAL COST
100	ACCEPTANCE TEST	100.00	100.00	21,000.00
101	ACCEPTANCE TEST PREP	100.00	100.00	21,000.00
102	ANALYSIS	100.00	100.00	21,000.00
103	BASELINE	100.00	100.00	21,000.00
104		100.00	100.00	21,000.00
105		100.00	100.00	21,000.00
106		100.00	100.00	21,000.00
107		100.00	100.00	21,000.00
108		100.00	100.00	21,000.00
109		100.00	100.00	21,000.00
110		100.00	100.00	21,000.00
111		100.00	100.00	21,000.00
112		100.00	100.00	21,000.00
113		100.00	100.00	21,000.00
114		100.00	100.00	21,000.00
115		100.00	100.00	21,000.00
116		100.00	100.00	21,000.00
117		100.00	100.00	21,000.00
118		100.00	100.00	21,000.00
119		100.00	100.00	21,000.00
120		100.00	100.00	21,000.00
121		100.00	100.00	21,000.00
122		100.00	100.00	21,000.00
123		100.00	100.00	21,000.00
124		100.00	100.00	21,000.00
125		100.00	100.00	21,000.00
126		100.00	100.00	21,000.00
127		100.00	100.00	21,000.00
128		100.00	100.00	21,000.00
129		100.00	100.00	21,000.00
130		100.00	100.00	21,000.00
131		100.00	100.00	21,000.00
132		100.00	100.00	21,000.00
133		100.00	100.00	21,000.00
134		100.00	100.00	21,000.00
135		100.00	100.00	21,000.00
136		100.00	100.00	21,000.00
137		100.00	100.00	21,000.00
138		100.00	100.00	21,000.00
139		100.00	100.00	21,000.00
140		100.00	100.00	21,000.00
141		100.00	100.00	21,000.00
142		100.00	100.00	21,000.00
143		100.00	100.00	21,000.00
144		100.00	100.00	21,000.00
145		100.00	100.00	21,000.00
146		100.00	100.00	21,000.00
147		100.00	100.00	21,000.00
148		100.00	100.00	21,000.00
149		100.00	100.00	21,000.00
150		100.00	100.00	21,000.00
151		100.00	100.00	21,000.00
152		100.00	100.00	21,000.00
153		100.00	100.00	21,000.00
154		100.00	100.00	21,000.00
155		100.00	100.00	21,000.00
156		100.00	100.00	21,000.00
157		100.00	100.00	21,000.00
158		100.00	100.00	21,000.00
159		100.00	100.00	21,000.00
160		100.00	100.00	21,000.00
161		100.00	100.00	21,000.00
162		100.00	100.00	21,000.00
163		100.00	100.00	21,000.00
164		100.00	100.00	21,000.00
165		100.00	100.00	21,000.00
166		100.00	100.00	21,000.00
167		100.00	100.00	21,000.00
168		100.00	100.00	21,000.00
169		100.00	100.00	21,000.00
170		100.00	100.00	21,000.00
171		100.00	100.00	21,000.00
172		100.00	100.00	21,000.00
173		100.00	100.00	21,000.00
174		100.00	100.00	21,000.00
175		100.00	100.00	21,000.00
176		100.00	100.00	21,000.00
177		100.00	100.00	21,000.00
178		100.00	100.00	21,000.00
179		100.00	100.00	21,000.00
180		100.00	100.00	21,000.00
181		100.00	100.00	21,000.00
182		100.00	100.00	21,000.00
183		100.00	100.00	21,000.00
184		100.00	100.00	21,000.00
185		100.00	100.00	21,000.00
186		100.00	100.00	21,000.00
187		100.00	100.00	21,000.00
188		100.00	100.00	21,000.00
189		100.00	100.00	21,000.00
190		100.00	100.00	21,000.00
191		100.00	100.00	21,000.00
192		100.00	100.00	21,000.00
193		100.00	100.00	21,000.00
194		100.00	100.00	21,000.00
195		100.00	100.00	21,000.00
196		100.00	100.00	21,000.00
197		100.00	100.00	21,000.00
198		100.00	100.00	21,000.00
199		100.00	100.00	21,000.00
200		100.00	100.00	21,000.00

A summary report developed using *Power-Base*'s Job Costing template.

purchased, depreciation and lease schedules, and information about who uses the asset and for what purposes. Zoom links are established to allow you to jump from an individual asset record to its associated lease file.

This second file contains asset class codes and descriptions and is used primarily by the system to look up information for the other files. The lease file also serves to validate data entry for both first and second files.

An employee file contains names, numbers, and department codes for validating information in other parts of the system. This built-in error-checking simplifies data entry considerably. The last two files are depreciation schedule and summary, which calculate recovery years, depreciation percentages, total assets, and more.

Seven preset reports are available to provide you with screen or hard copy of everything you could need, from a complete listing of fixed assets by department and used to a depreciation summary. It's a good template, though not as complex as *Inventory Control* or *Order Processing*, and if you know *Power-Base* well, you could probably write your own version in a couple of days. *Fixed Asset Management* (\$79.95; requires *Power-Base*) works well on a floppy disk system.

## Job Costing

Although this job-costing template is based on a very simple algebraic model, its performance is elegant. It is useful not only for tracking the cost of current jobs but for forecasting future projects as well, and a neat little feature allows you to compare those forecasts against your actual job costs and time schedules.

The fundamental model behind *Job Costing* is Direct Costs (Resource Units × Unit Cost) + Overhead Costs (Direct Costs × Overhead Rate); what this yields is tremendous flexibility because you define the Resource Units, Unit Cost, and Overhead Rate variables. And don't forget: All *Power-Base* templates can be redesigned to suit the special re-requirements of a particular situation.

In most cases, completing a job does not concern the use of just one service but will have many related items that contribute toward the total cost. *Job Costing* takes care of this by coding each individual task to the overall job. Thus you can analyze a complete job or any of its separate tasks. You might analyze the percentage of all your currently uncompleted jobs or compare actual versus forecast performance on a single task. *Job Costing* (\$79.95; requires *Power-Base*) does not require a hard disk.

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# NEW ON THE MARKET

## FASTread

This computer-assisted instruction program contains more than 80 lessons to help the user read faster. *FASTread* lets the user set

listings for basic index entries automatically. Other features include automatic capitalization and, in conjunction with its sorter, handling of such operations as indexing hyphenated words, abbreviations, numbers, family names, chemical name prefixes, Greek letters, subscripts and superscripts, and other difficult words that can arise in text.

**List Price:** \$89

**Requires:** 256K RAM, one disk drive, DOS 2.0 or later.

**Santa Barbara Software Products**

1400 Dover Rd.  
Santa Barbara, CA 93103  
(805) 963-4886

CIRCLE 656 ON READER SERVICE CARD

## ACCO Desk Top Printer Stand

Users of desktop dot matrix printers might appreciate this stand from ACCO International. Available in three models, the ACCO Desk Top Printer Stand accommodates 80- or 132-column printers with either rear or bottom-slot paper feeds. It will hold up to four different fanfold forms ready for insertion into the printer. A handy printout tray supports up to 200 sheets of paper and can be adjusted to exactly



ACCO Desk Top Printer Stand, ACCO International

match the height at which paper leaves the printer.

**List Price:** \$39.95

**ACCO International**  
770 S. Acco Plaza  
Wheeling, IL 60090  
(312) 541-9500

CIRCLE 661 ON READER SERVICE CARD

## Paradise Modular Graphics Card

This display adapter from Paradise Systems Inc. allows users to run software with graphics written for the IBM Color/Graphics Adapter on either color or mono-

chrome monitors. The Paradise Modular Graphics Card displays as many as 16 colors on color monitors or 16 shades on PC-compatible monochrome monitors and has flicker-free scrolling. Connectors are provided for light pens and composite video monitors. Software for a RAMdisk and print buffer are included. An optional piggyback card adds up to 384K bytes of RAM, a parallel printer port, a serial communications port, and a battery-backed clock/calendar.

**List Price:** Display adapter alone, \$395; BackPack module, \$299  
**Paradise Systems Inc.**  
217 E. Grand Ave.  
South San Francisco, CA 94080  
(415) 588-6000

CIRCLE 648 ON READER SERVICE CARD

## SuperBatch

This extended batch file processor from the Merrill Street Software Division of BCC Inc. can store and execute an infinite



goals and pacing, then presents progress reports in graphic or text form. The program's stored text selections can be expanded with the inclusion of ASCII files from any word processor, giving the user virtually unlimited practice material.

**List Price:** \$59.95

**Requires:** 128K RAM, one disk drive, DOS 2.0 or later.

**Achievement House**  
103 Great Plain Rd.  
Dunbury, CT 06811  
(800) 551-1133  
(203) 748-0277

CIRCLE 659 ON READER SERVICE CARD

## IndexAid

This indexing program from Santa Barbara Software Products can produce complex indexes of any ASCII or WordStar-formatted text file regardless of the size of the document. *IndexAid* can produce transposed or "see also"



Paradise Modular Graphics Card, Paradise Systems Inc.

## New on the Market Submissions Guide

All submissions to *New on the Market* should follow these guidelines:

1. Include the retail price and details of both hardware and software needed for an end-user to properly use your new product. This includes required amount of RAM, number and type of drives, operating systems supported, and peripheral equipment needed.
2. Releases should be typewritten double-spaced on one side of the paper. Copies of advertisements may be included, but in most instances we need more information than is typically included in an ad. Include telephone contacts for marketing and technical questions.
3. If available, include black & white glossy photos of the product, 4 by 5 inches or larger.

*New on the Market* does not review products; do not send sample or demo copies of software. All product announcements are run on a space-available basis, at the exclusive discretion of the editor. Please note that it is impossible to guarantee publication of a product announcement for any particular issue.

number of keyboard commands; it can also move between any number of applications without affecting their operations. Requiring only 10K bytes of RAM, *SuperBatch* does not require individual macro definition files for each application and can run applications unattended from its control batch file.

A *SuperBatch* ASCII file consists of a series of commands, program specifications, and data. This information is released character by character by the *SuperBatch* processor to the user's system, which acts upon these characters as if they were being typed from the keyboard. Unlike a macro key processor, however, there is no limit to the number or type of characters that can be stored, and the speed at which *SuperBatch* operates is controllable by the user.

**List Price:** \$79.95

**Requires:** 128K RAM, one disk drive, DOS 2.0.

Merrill Street Software Division  
of BCC Inc.  
251 Merrill St.  
Birmingham, MI 48011  
(313) 645-5280

CIRCLE 646 ON READER SERVICE CARD

### CPAids Time & Billing Program

CPAids Inc. has released a program that can be used by any business that bills clients on a time-spent basis to produce invoices, maintain accounts receivable files, and generate a range of management reports. Because of extensive on-screen prompting for information, the *CPAids Time & Billing Program* requires little expertise from the data entry operator. Entered data is automatically checked for validity against criteria that have been specified

by the user for every field.

Available reports include summary-type or itemized client bills, which allow as much detail to be included within the report as needed. *CPAids Time & Billing Program* can also print lists of billable hours and expenses on the invoice and maintain another list of actual hours and expenses incurred for in-house management use. The software can maintain up to five different billing rates per employee for as many as 100 employees charging time and expenses to up to 1,000 clients.

**List Price:** \$595

**Requires:** 192K RAM, two disk drives, DOS 2.0 or later.

CPAids Inc.  
1061 Fraternity Circle  
Kent, OH 44220  
(216) 678-9015

CIRCLE 646 ON READER SERVICE CARD

### SCOMP

A new utility designed to supplement the DOS COMP command has been introduced by Computer Solutions. *SCOMP* compares two ASCII text files line one at a time, displaying only those areas of each file where a mismatch occurs. The utility handles the addition, deletion, and replacement of lines by resynchronizing on four successive matching lines.

**List Price:** \$9.95

**Requires:** 64K RAM, one disk drive, DOS 1.1 or later.

Computer Solutions  
P.O. Box 3440  
Bowling Green, KY 42102  
(502) 782-4016

CIRCLE 647 ON READER SERVICE CARD

### Seikosha Printers

Hattori Seiko Computer Peripherals, a newly formed division of Hattori Corp. of America, has announced two dot matrix printers as part of its initial product offerings. The wide-carriage Seikosha BP-52001 printer incorporates all IBM PC characters, symbols, and graphic elements as standard features. The Seikosha BP-52001 printer also offers a variety of print fonts, print speeds up to 206 characters per second in draft mode, a 4K-byte RAM buffer, and construction intended for high-volume use.

Intended for personal use, the



**Seikosha BP-52001 Printer,**  
Hattori Seiko Computer Peripherals

Seikosha SP-1000 printer features a variety of character fonts as well as both friction- and tractor-feed mechanisms. It is available with serial or parallel interfaces.

**List Price:** BP-52001, \$1,080; SP-1000, \$299

Hattori Seiko Computer  
Peripherals  
111 MacArthur Blvd.  
Mahwah, NJ 07430  
(201) 529-5730

CIRCLE 651 ON READER SERVICE CARD

### FormTool

BLOC development corp. has released a program for creating and storing business forms on-disk. The *FormTool* forms editor makes use of windowing techniques that allow multiple related forms to be edited at one time. Other features include block operations, advanced display management capabilities, and extensive on-line help.

**List Price:** \$75

**Requires:** 256K RAM, one disk drive, DOS 2.0, dot matrix printer.  
BLOC development corp.  
1301 Dade Blvd.  
Miami Beach, FL 33139  
(305) 531-0513

CIRCLE 655 ON READER SERVICE CARD

### UTILFLEET

Fleet managers can now monitor fuel, scheduled maintenance, repairs, insurance, licenses, depreciation, and other cost factors for the equipment under their control using this package from Teconomics. The program automatically notes when scheduled maintenance must be performed and produces a bar graph com-

parison of operating costs for all vehicles in a fleet.

Up to 80 vehicles can be stored per data disk, and each record includes such fields as tag number, serial number, year, make, model, odometer reading at purchase, purchase price, purchase date, and vehicle weight. *UTILFLEET* can produce an individual report for each vehicle in a fleet showing itemized and total costs, as well as comparison reports for all vehicles.

**List Price:** \$295

**Requires:** 128K RAM, one disk drive, DOS 2.0.

Teconomics  
100 Ardmore St.  
Blacksburg, VA 24060  
(800) 368-3532  
(800) 552-1821 in Va.

CIRCLE 644 ON READER SERVICE CARD

### IOAS-3

Micro Architect Inc. has released a low-cost integrated software system with database management, spreadsheet, and word processor components under an innovative distribution method. Under this marketing plan, users who purchase one copy of the *IOAS-3* can copy the software



**IOAS-3 Component of the**  
IOAS-3 System, Micro  
Architect Inc.



freely without incurring software license penalties.

**IOAS-3** components include the following:

- **IDM-X Data Base Manager**—Features a built-in sort/merge facility that offers rapid access to records, a menu-driven operation, and an extensive report writer.

- **SS-X Spread Sheet**—Supports colors, sorts, searches, and the ability to consolidate several spreadsheets. This component can also produce bar charts.

- **Word-X Word Processor**—Includes a full-screen editor with word wrap and multiple-file merging capability. Also features on-line help and easily remembered commands and function keys.

**List Price:** \$49.95

**Requires:** 128K RAM, one disk drive, DOS 1.1 or later.  
**Micro Architect Inc.**  
 6 Great Pine Ave.  
 Burlington, MA 01803  
 (617) 273-5658

CIRCLE 648 ON READER SERVICE CARD

### Ditron Printer Buffer

Ditron Corp.'s internal printer buffer is a half-size board offering from 64K to 256K bytes of dedicated memory and a parallel printer port. Included with the board is a set of RAM-resident utility programs that allow the user to easily erase the buffer's memory or exchange printer adapters (LPT1 for LPT2, and so



**Ditron Printer Buffer,**  
**Ditron Corp.**

forth) either from the DOS prompt or from within an application.

**List Price:** 64K RAM, \$155;  
 256K RAM, \$180  
**Ditron Corp.**  
 4026 W. John St.  
 Phoenix, AZ 85308  
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### Fantasy

PROSOFT has released a typeface and drawing system that supports newsletter creation on an IBM PC with user-definable page layouts, multiple columns, and the ability to flow text automatically around boxes, circles, and other reserved areas. *Fantasy*



uses page layout templates to merge graphic images with text to produce newsletters. Each completed page may be further refined on-screen before it is printed.

The system offers several multiple-column newsletter templates, as well as an editor for creating other templates. Text files from any ASCII word processor or editor can be included with on-disk clip art images and decorative type fonts. They can be printed using any IBM-compatible dot matrix printer or the HP Laserjet Plus laser printer. A catalog of over 270 decorative fonts in the *Fantasy* library is offered with the software.

**List Price:** \$49.95

**Requires:** 128K RAM, one disk drive, DOS 2.0.  
**PROSOFT**  
 7248 Bellaine Ave.  
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 (818) 765-4444

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### Planning Pro

Keper-Tregoe Inc. has added a new planning program to its *PRO-COUNSEL* series of management aids. *Planning Pro* helps managers create project plans using a simple breakdown approach that leads the manager through all facets of the planning

process. A special provision within the program pinpoints potential problems in a plan and can be used to create contingency actions that can be triggered automatically if problems do occur. Other features of the program include the ability to produce Gantt charts and to sort key data into management reports useful for scheduling work and monitoring progress.

**List Price:** \$350

**Requires:** 256K RAM, two disk drives, DOS 2.1 or later.  
**Keper-Tregoe Inc.**  
 P.O. Box 704  
 Princeton, NJ 08542  
 (609) 921-2806

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### AMI PC-AT Multi-User Board

American Micronics Inc. is offering a plug-in board for the IBM PC AT that permits up to eight serial devices (including remote terminals) to be connected to the user's system. The board functions as an interrupt-driven I/O device and supports all control lines necessary to drive most asynchronous terminals, printers, and modems.

The AMI PC-AT Multi-User Board is installed in one of the PC AT's 8-bit slots, and a ribbon cable is routed through the system's back panel to a terminal box containing eight RS-232 serial ports. The included device driver, running under the XENIX operating system, allows up to eight terminals to be linked. Additional software permits the user to access the eight ports as COM1 through

COM8 under DOS. A separate four-port model of the board is also available.

**List Price:** 4-port model, \$375; 8-port model, \$575  
**American Micronics Inc.**  
 17811 Skyport Circle, #H  
 Irvine, CA 92714  
 (714) 261-2428

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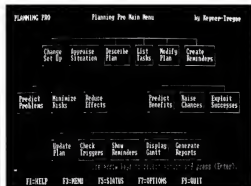
### Carr Lane Symbol Library

Carr Lane Manufacturing Co. has downported its extensive symbol library of tooling components for use with the *VersaCAD* computer-aided design package. Distributed by T & W Systems Inc., producers of the *VersaCAD* system, the *Carr Lane Symbol Library* contains more than 6,000 drawings that represent over 5,100 individual jig and fixture components, including pins, clamps, rests, bases, positioners, jaws, handles, and bushings. All are available to the *VersaCAD* designer by part number. Each component is shown in full scale and complete detail and can be easily fitted into proper position and size within a *VersaCAD* drawing. The complete *Carr Lane Symbol Library* comes on a set of 70 disks, with a companion 200-page reference manual.

**List Price:** One-time license fee, \$1,495

**Requires:** VersaCAD  
**T & W Systems Inc.**  
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 (714) 847-9960

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**Planning Pro, Keper-Tregoe Inc.**



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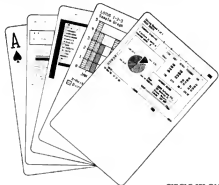
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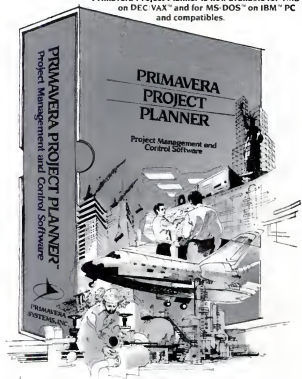
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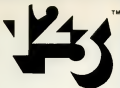
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STB's EGA *PLUS*<sup>™</sup> is a universal video board that operates in 16 different text and graphics modes, and is compatible with the IBM Enhanced Graphics Adapter<sup>™</sup>. STB's EGA *PLUS*<sup>™</sup> also provides 256K memory without need for the IBM Graphics Memory Expansion Card<sup>™</sup>... saving you money!

#### YOU COMPARE THE FEATURES:

STANDARD FEATURES	EGA <i>PLUS</i> <sup>™</sup>	IBM <sup>™</sup>
Supports IBM PC XT/AT <sup>™</sup> and compatibles	✓	✓
Supports 640 × 350 for IBM's Enhanced Color and Monochrome Displays and compatible monitors	✓	✓
Supports full 16 colors in 640 × 350 on the IBM Enhanced Color Display <sup>™</sup> and compatibles	✓	✓
Supports full 16 colors in 640 × 200 and 320 × 200 for the IBM Color Display	✓	✓
Parallel printer port	✓	
Soft scrolling, panning and windowing	✓	✓
Optional Clock/Calendar	✓	
Supports a light pen interface	✓	✓
Includes PC Accelerator <sup>™</sup> , STB's exclusive utility program which provides up to 10 disk emulators, 3 print spoolers and utilizes available system memory: PC-AT memory above one megabyte and EMS memory (Lotus <sup>™</sup> "Intel <sup>™</sup> " Microsoft <sup>™</sup> ) through STB's Memory Companion PC <sup>™</sup> board	✓	
Which board sells for 40% less than the other comparable product?	✓	

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CIRCLE 517 ON READER SERVICE CARD

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